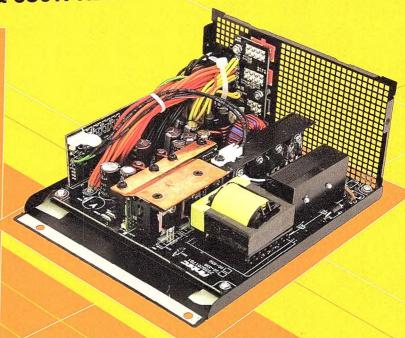


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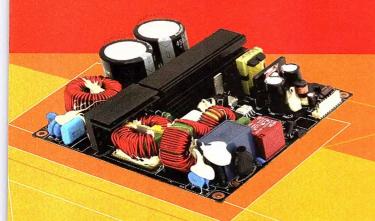












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EDHEAD

It's here!

This time of year it's only natural to have money on your mind. There's holidavs coming, presents to buy (yeah, yeah, this is our January issue, but you and I know that if you bought this mag when it comes out you're still in December), and on top of all that there's thing that everyone calls the Global Financial Crisis making people in suits very nervous.

Hmm. Note to self: maybe I should make a game mod called Financial Crysis - could be very lucrative... but I digress.

So with, money getting tight, a lot of people are going to be reconsidering how they spend their hard-earned. That being the case, I've got a piece of advice for the cash-strapped enthusiast out there: don't stop buying Atomic, or magazines like it.

Think of a magazine like this one as a sound investment. Now more than ever, how you spend your money, and what it gets for you, is going to be of top importance. Once upon a time you might have thought you could be blase about a tech purchase, but now you really need to be careful.

And we can help.

As a case in point, we've decided to take a budget angle with this month's Head2Head, taking a mess of sub-\$200 cards to task and putting them through their paces. We've found three top cards - a performance king, a value choice, and a bang-for-buck contender - and we feel they'll suit gamers and the budget concious alike.

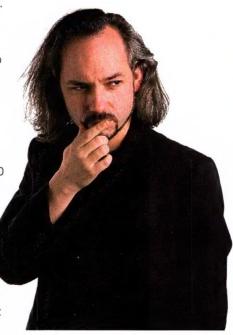
The other thing an enthusiast needs to consider is that with Nehalem now on the market (we look at the cheaper of the series this issue too.

by the way), some serious upgrading is on the horizon. If you want to invest in this new CPU you'll need new RAM and a new motherboard to get it all up and running. That's a serious layout of cash right there, and we want to help you make the best hardware decision.

And if you can spare it, we recommend the upgrade - it'll be the last big one you need for a long, long time.

Finally, the last reason to buy Atomic... I need a Nehalem rig of my own!

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Eliterate and preduct submissions in Aromic vectorous all information on new and upgraded products and services for possible elicitorage. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. The Editor velcomes ideas for articles, preferably sent in outline form, with bedalls of the author's background and a few samples of previously published work.

We cannot accept responsibility for unsolicited copy and stress that it may take some time for a reply relating to these submissions to be sent out.



ISSUE

LOGIN	8
X-Ray Ins and outs of internet filtering	12
I/O Our monthly helpdesk.	18
World of Modcraft Can mods boost your gaming?	20
HARDWARE	37
Intel Core i7 920 CPU	30
Gainward 4870 X2 Goes Like Hell graphics card	31
MSI DKA790GX Platinum mobo	33
MSI X58 Eclipse	34
MSI X58 Platinum	35
ASUS Rampage II Extreme	36
GIGABYTE X58	38
GIGABYTE EP45-UD3P	40
Coolermaster N620 CPU cooler	41
Corsair Triple Channel RAM	41
Xonar HDAV sound card	42
Verbatim Rapier V1 gaming mouse	43





WINHARD DRIVES &

January

Razer Salmosa mouse	43
Orbita mouse	44
Antec 1200 PC case	45
Deus Ex OC PC	47
Lian LI PC-K8	48
HEAD2HEAD Sub-\$200 graphics cards	50
KITLOG	62

The very best enthusiast gear.

62

TUTORIALS	69
The ZFS Box Jake Carroll outlines his plans for media domination.	70
Windows Home Server Stephen Reeves finishes off the ultimate data store.	74
Atomic.edu Chris Taylor wants you to learn stuff.	78
Geec Chic	81 n.

GAMEPLAY	83
Engine Room Mechwarrior: Living Legends Battlemechs make a welcome retu our report on an ongoing Crysis m	
Left 4 Dead	90
Fallout 3	92
Call of Duty: World at War	94
Midnight Club LA	95
WoW: Wrath of the Lich King	96





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Minority Report interface

Wave your hands in the air like you just don't care!

You know the coolest thing about the movie Minority Report? No, it wasn't that couch-jumping lunatic Tom Cruise, nor was it the reasonable but unremarkable plot. It was of course the uber-cool interactive screens that Tom got to play with at various points in the film. Seemed like a bit of a science fiction fancy at the time, but Oblong Industries has developed a very similar system with the intention of commercial and home use.

The 'G-speak' spatial operating environment is a clever combination of gestural IO, recombinant

networking and real-world pixels (whatever the hell those are) to create an interface where the user can control the position and flow of onscreen objects from a distance, using hand and arm gestures. The idea behind the system is to assist in operating three-dimensional interfaces and work with collaborative applications in unique ways, but despite the hyperbole it has to be said, is it really that useful? Do we want to spend hours waving our arms around like we're in a fit just to navigate Windows? If you're interested, check out **oblong.com**

iPhone, the gamers phone?

Apple's sexy tech proves a popular game platform.

Love it? Hate it? Whichever it is, recent consumer panel reports from the NDP group show that iPhone gaming is an activity that's on the rise in a big way. The survey conducted among over 3,000 members of the NDP's consumer panel between September 16th and 23rd found that, over the past three months, iPhone owners increased the gaming they did on the smartphone more than their use of any other application.

So it's concrete, Apple executives are stoked and big name companies like EA are equally impressed with the platform. Patrick Gunn, director of marketing for EA mobile recently unveiled Need for Speed Undercover for the iPhone, which Gunn says "takes full advantage of all the unique elements like touch, flick, accelerometer and motion sensitivity. Graphically, the game appears on par with a PSP title."





Sad news for sci-fi MMO buffs, but Tabula Rasa will be closing its servers on the 28th February 2009. In a move that's been attributed squarely to the flagging player population (and therefore revenue) of the game, Tabula Rasa will become free to play for its last month of operation before finally going to that great MMO graveyard zone in the sky. The developers have assured the remaining players that they won't just be dumping the title and will have plenty of fun things happening between now and d-day to make staying on till February worthwhile.

The 'World's top 500 supercomputers' list is pure sex for ultra nerds, and the 32nd edition just got released for scrutiny. The Los Alamos system called 'Roadrunner' managed to barely fend off a challenge from the Cray XT5-based 'Jaguar' supercomputer at Oak Ride National Laboratory. Roadrunner is only the second supercomputer to break the petaflop/s barrier with a record 1.059 petaflops/s running the Linpack benchmark application. For the unlearned, that's over one quadrillion floating point operations per second. Do we want to run Super Pi on it so we can see the big numbers and summarily cream ourselves? You better freaking believe it.

Eidos and censorship

James Matson knows the truth is out there, it's just going to be a little late.

A lot of people place stock in game reviews. Whether we end up basing a purchasing decision on the words or rating attached to a game by a particular review source is largely immaterial, many of us will still factor it in. The game review – good or bad – becomes a part of the process. So, you can imagine that we'd all like to get our hands on those reviews in a timely manner and with an opinion that's solely the thoughts of the person reviewing it, free from bias and Orwellian mind control.

It would seem however, that Eidos Interactive (the publisher behind of Age of Conan, Hitman and Tomb Raider) has a different concept of game reviews and how they should be crafted. In what can plainly be seen (at Eidos' own

which itself is just an average of many online review scores for a game. While you'd honestly expect the PR firm to deny an accusation like this or at least coat it in glazed honey and unicorns, when approached for comment the company unashamedly confirmed the rumor in a chat with gaming site Videogamer247.

"That's right. We're trying to manage the review scores at the request of Eidos," a representative of the firm advised. "We're trying to get the Metacritic rating to be high, and the brand manager in the US that's handling all of Tomb Raider has asked that we just manage the scores before the game is out really, just to ensure that we don't put people off buying the game, basically."

a bit of an image problem, a problem that stems from the fact you can in theory give any monkey 40KB of web space and a HTML template and they can become some sort of online critic. There are those few online outlets that we trust to review products – games included – in amongst the noise, and to see companies like Eidos attempting to affect the way those outlets conduct the business of providing unbiased and timely reviews further erodes our trust.

The other thing that brings a tear to our eye is that it isn't the first time Eidos has been involved in something like this. Those with a decent memory might recall the Kane & Lynch 'Gerstmann' fiasco from last year, where a reviewer was believed to be fired from a review outlet for an unfavorable write-up of the title. Come on Eidos, don't do this – don't deal this way. If you publish games, make them good and if they're at risk of stinking, then suck it up and wear it, don't erode the last vestiges of faith in online journalism that remain intact.

"... the brand manager in the US that's handling all of Tomb Raider has asked us that we just manage the scores before the game is out."

admission) as an attempt to prevent unfavorable reviews of Tomb Raider: Underworld making it online before it has had a chance to sell a bunch of copies, the company has given a PR firm the job of convincing review sites to hold off publishing reviews if the scores are below a certain threshold.

The whole debacle originally came to light thanks to a UK journalist posting on Twitter to say he received a call from Eidos asking him to hold off publishing a review of Tomb Raider if the score would be below 8.0 until the title had been on sale for three days.

Apparently this same request was made to a number of gaming portals with the hopes of positively affecting the overall 'meta score' for the game provided by the Metacritic website, What the hell? Take careful note of the last sentence if nothing else. What that bit of PR fluff boils down to, is that Eidos has at least a fair inkling that some Tomb Raider reviews will be less than favorable – possibly floating below the 70 per cent line – and as such don't want readers to have access to them before they've managed to have a shot at selling you the game anyway. So what then, is the point of a review?

In Eidos-land it would appear that a review is designed to be something you get access to after purchasing a product, so you can exclaim "well damn I got me a lemon! Wish I'd known about that before!" and drool a little more into your bib.

It's a sad state of affairs on two fronts – the first is that online gaming journalism suffers from



DNLINE

The last month has seen some great content go up on our site. If you don't already, you really should bookmark www.atomicmpc.com.au and check it regularly. Alternately, sign up for our Newsletter and you'll get a weekly round up of all the news, features and more we've posted.

And then there's our Post of the Month on our forums - always gold!

The title for this month goes to an insanely technical post that left a lot of the mods wondering what the hell it was about, luckily *iamthemaxx* pointed out the

gold therein (PS – please send kick backs to my ICQ address - maxx).

So congratulations *NagChampa* for this ripper titled X forwarding over SSH, the security risks!

http://forums.atomicmpc.com.au/index.php?showtopic=3500

There's a few honourable mentions as well!. sureshot_77 with a fraking awesome first post we've dubbed Ode to Atomic LIVE:

http://forums.atomicmpc.com.au/ index.php?showtopic=1583&view=findpo st&p=70142 Athiril, with a great guide for the voyeuers, be they nature, still life or 'other' – Introduction To Photography, An introduction to the technical and creative sides of real photography:

http://forums.atomicmpc.com.au/index.php?showtopic=72

And finally a golden post from a roasted golden oldie, *PhR33X*, The code not maketh the community, It's community that maketh Atomic:

http://forums.atomicmpc.com.au/index.php?showtopic=3092



Say hello to max headroom

Overclocking is all about headroom and the ASUS ROG Rampage II Extreme delivers heaps of it. For this, it has Extreme Engine - a next-generation dynamic multi-phase power management system equipped with high performance Multi-layer type Polymer Capacitors (ML Caps) - to thank. Extreme Engine ensures a stable power supply during overvoltage by lowering Equivalent Series Resistance (ESR), keeping missioncritical components such as the processor, system memory and the Northbridge reliable. This means you'll be able to push your spanking new Intel Core i7 CPU to the very limit, hitting benchmark scores that others won't even begin to sniff.



ML Caps: The hallmarks of an exceptional overclocking board

Why choose when you can have both?



No more split hairs choosing between GPU setups with SLI/Crossfire on Demand

SLI or CrossFireX? That's a perennial question that has crossed every serious gamer's mind. Here's the good news. With the ROG Rampage II Extreme, you'll be able to run both multi-GPU setups. Yes, you heard right. The board features SLI/CrossFire on Demand technology, supporting up to three graphics cards in a 3-Way SLI or CrossFireX configuration. Whichever path you take, you can be assured of one thing - jaw-dropping graphics performance at a level previously unseen.

ASUS ROG Rampage II Extreme A POWERFUL COMBINATION FOR CYBER DOMINATION

Boasting a benchmark-busting brew consisting of Extreme Engine, Tweaklt and SLI/CrossFire on Demand technology, the Republic of Gamers has unleashed - without a shadow of a doubt - the mother of all enthusiast boards.

Speed. Power. Stability. Everything overclockers could possibly want from an Intel® X58 chipset-based enthusiast motherboard is in the ASUS ROG Rampage II Extreme. A next-generation dynamic multiphase power management system? Check. Real-time hardware voltage tweaking? Check. Support for both 3-Way SLI and CrossFireX setups? Check. The Republic of Gamers (ROG) clearly knows dominating cyber worlds takes serious equipment. And oh, how it has delivered.



Get all hands-on with hardware-based overclocking



TweakIt's back again now joined by a new ally - Probelt

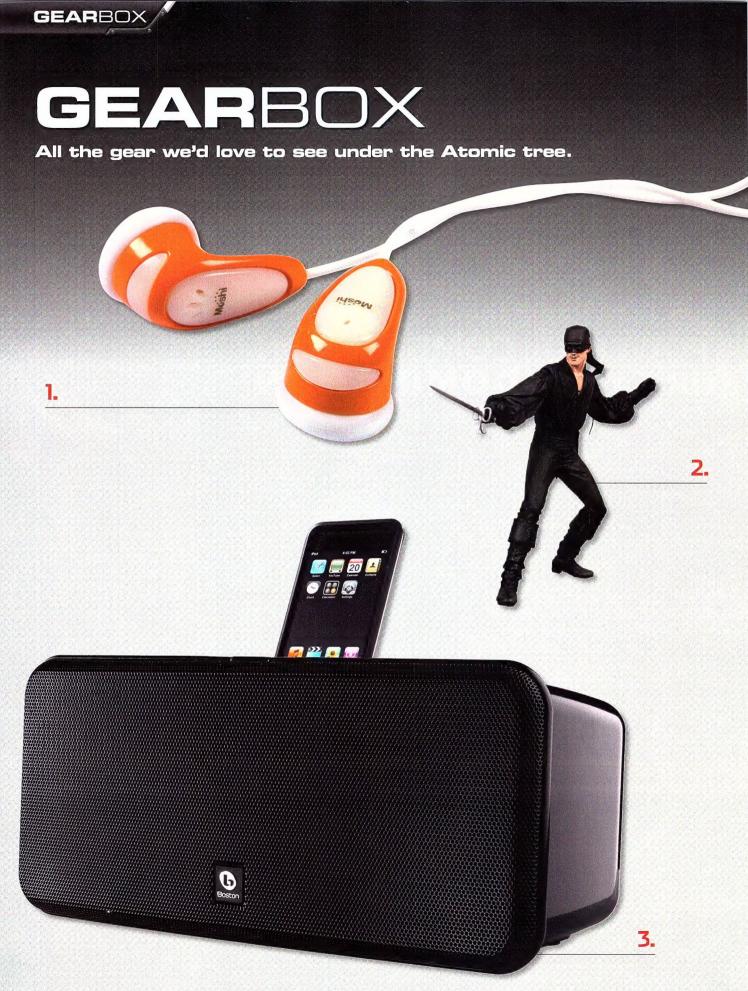
You hear the expression "puts power in your hands" often enough, but ROG has taken it to the next level with the Rampage II Extreme. The board boasts two innovative hardware overclocking solutions: Tweaklt and Probelt.

Tweaklt enables you to make real-time changes to your system's core frequency, voltage and other parameters using the joystick-like control on the motherboard itself - even while your

benchmark utility is running! Probelt, on the other hand, takes the guesswork out of locating the motherboard's measurement points, identifying them clearly in the form of eight sets of detection points so you'll know exactly where to get quick yet accurate readings using a multi tester.

The ASUS ROG Rampage II Extreme is an amalgamation of the best technologies and features out there. It is cutting-edge in every sense of the word, a mighty motherboard built to withstand the torture and abuse inflicted by the most avid

inflicted by the most avid of overclockers. Which is why we dub it without hesitation: the mother of all enthusiast boards.







1. Moshi headphones

Price \$14.99 Website http://lomis.com.au

Here's a neat thing. It's ostensibly a set of earbud headphones for kids, designed to limit the amount of extreme noises pumped straight into developing eardrums, but we think this is handy for anyone. There's a lot of reports coming out that the prevalence of in-ear headphones is causing a lot of damage to iPod addicts, and we think this is a good answer. It's that, or look like a DH wannabe with a set of huge over-ear models that would look more natural in Ibiza than on the train to North Sydney.

2. Dread Pirate Roberts

Price \$US15.99 Website www.thinkgeek.com

Don't worry about the eight points of articulation. Don't get excited about the reasonable price, or the fact that it's a good 7in tall. All you need to know about this awesome piece of mostly black plastic awesomeness is that it's the Dread Pirate Roberts, from possibly one of the coolest films ever committed to celluloid, The Princess Bride.

And if, like us, you've been waiting for such a toy as this for what feels like forever, just remember the words of Miracle Max: You rush a miracle man, you get rotten miracles.î

Razer Messenger Bag

Price \$TBC Website www.razerzone.com

You can argue all you like about the quality of Razer gear – some people hate it, some people love it. So, if you're in the former camp, just move on. Maybe look at that awesome Dread Pirate Roberts figure again.

But, if you love that smooth, slinky feel of black rubber beneath your fingers (and we admit, we're kinda partial to it), then you may want to match your mousing, keyboarding and other Razer gear with this sharp looking Razer messenger bag. It's roomy, with room for a laptop and other gear, plus - if you are pure Razer - then you can pretend you're one of those high-end, sponsored pro gamer types!

4. Boston Acoustics i-DS2

Price \$399 Website www.bostonacoustics.com

The Horizon i-DS2 is all about bringing a new level of fun, flexibility and performance to the iPod experience. The sleek and compact unit literally fits anywhere (okay, we may be exaggerating that one, and we take no responsibility for trips to the hospital if you try and take us at our word) and can easily be moved from room to room.

Best of all, with its premium quality high-performance loudspeakers and powerful 60 watt system, it's not just convenient but it sounds great as well, And it comes in pink, which we know you all love.

5. Aiptek Pocket Cinema

Price \$579 Website www.aiptek.de

Here's something you gotta dig. It's a handheld projector - it's only capable of projecting at 640 x 480, but the fact that you can take this with you, to project on any surface (you know, like aircraft ceilings, the backs of seats on the bus, your tubby friend's belly) just rocks our cotton socks off.

In fact, what we'd really like to do is use it to project a virtual friend on nearby walls, someone we know we can always talk to. Hell, screw that, we just want to project Cortana from Halo.

That would rock.





Internet filtering, spam filtering, and even search filtering are all hot topics. But what do they do and how do they work? **Ashton Mills** filters the data (yeah, we went there!)

Whith Senator Conroy's crusade to send Australia's internet backbone into the dark ages, the topic of internet filtering has been getting plenty of air time. Most of us understand the basics of what this means, but the technology of filtering is much more than just web pages, and the mechanisms behind it dictate both its capability and its use. And, of course, its means of circumvention.

So what types of filtering are there, and how do they work?

Web filtering

Mistakenly called 'internet filtering', this is usually browser-based access to information and, specifically, of HTTP. This is important, especially to the ongoing internet filtering debate, since the web and HTTP is of course just one of many aspects of online communication.

The techniques for web filtering are many and varied, but the key points are that it can be implemented at the ISP level or at the end-point, the PC. At the PC this is done by 'net-nanny' software running on a machine that, for example, parents can use to restrict and filter access to the internet. This is almost always more than just web access; it can include instant messaging, social networking, and even game restrictions.

The ISP level however, as proposed by the government's internet filtering scheme, is a different kettle of fish – the volume of traffic is huge, and it's dedicated hardware solutions that often does the work here.

The type of filtering techniques used at either of these levels can include black (restricted) and white (permitted) lists, which involve URL matching but can also be IP address-based, and cover both wide scope (domain) or narrow scope (port) detail depending on the application. And

while lists dictate what is or isn't allowed, the how depends very much on the implementation – URL blocking, IP blocking and DNS tampering are all options, with the latter being a particularly nasty form of filtering: with DNS tampering a URL you know to be real is resolved to a different address than the one it belongs to. This is one method used by China to not only prevent unwanted access to certain sites the government disagrees with, but to transparently re-direct people to sites the government wants them to see, which can include controlled media and propaganda.

Speaking of which, filtering can also occur with search engines, specifically with result removal. This is a rather insidious method, and a another form of censorship employed by China - if you do an image search for 'Tiananmen Square' on www.google.com you're greeted with pages of tanks and the famous stand-off of one student against the military. Do the same image search on www. google.cn in Mandarin and you get a very different story - not a tank or any images of violence to be found, just pictures of happy tourists and waving of the Chinese flag. You can bet that within China trying to access any English Google search engine will re-direct to the filtered Chinese one.

There are other techniques for web filtering, such as object analysis (evaluating the components of a web page against known 'bad' elements) and keyword searches (to classify a site not in a black or white list) but these are normally found on end-user products. The filtering which our government is focused on is basic, but extensive, black listing based on URLs and/or IP addresses – no one knows however, as it's not possible to obtain the list (which in itself raises warning bells).

Email filtering

This is an example of the type of filtering we like — spam, scam, and phishing removal. Dealing less with addresses and more with content, email filtering is a refined (but constantly under attack) science.

Like web filtering, black lists and white lists are par for the course with most email filtering products and features, usually with white lists being updated locally by what you tell your email client is not spam, and black lists being pulled from a central source and updated with the latest threats.

Lists like this can be effective, but not completely and not in a timely fashion – that lastest source of a spam wave needs to be indentified and added to the black list, by which time plenty of it has already been received.

Another technique that is often used is called rule-based rankings, which matches an email against a range of patterns commonly used in



Bluetack's Blocklist Manager can generate block lists for P2P software.



spam. The popular SpamAssassin works this way. The more patterns that match, the higher the score the email receives. Above a certain score, an email is considered spam and tagged as such, allowing you to automatically move or delete it out of your inbox. Like black lists, the patterns are frequently updated to match what is being seen in the evolution of spam, while at the same time some patterns (such as forged headers) remain a constant in identifying spam.

Another technique often employed is *Bayesian* filtering, where a mathematical formula using probable and improbable words for spam keywords provides a predictive rating for a message. Rather than requiring rules to be written, as with rule-based ranking, Bayesian filters can be 'trained' based on messages you mark as spam and not spam. As patterns in the structure of messages are learned, it becomes more and more accurate. Bayesian filtering is very effective after training, and unlike rule-based ranking, it automatically evolves as the spam does.

As with web filtering, email filtering can be implemented at the end-user level or at any stage in the network. Usually ISPs provide the service free for all mail passing through their servers, tagging emails accordingly and allowing you to delete or move them when they arrive by matching your own filter on a subject header.

Account Settings dave@needsmakeover.c... **Junk Settings** Server Settings Copies & Folders If enabled, you must first train Thunderbird to identify junk mail by using the Composition & Addressing Junk toolbar button to mark messages as junk or not. You need to identify both junk and non junk messages. Disk Space Junk Settings Enable adaptive junk mail controls for this account Return Receipts Security Local Folders ☑ Do not mark mail as junk if the sender is in: Personal Address Book Disk Space Trust junk mail headers set by: SpamAssassin **\$ Junk Settings** Outgoing Server (SMTP) ✓ Move new junk messages to: "junk" folder on: Local Folders 0 Other: Local Folders 0 Automatically delete junk mail older than 14 days

Thunderbird, like many email clients, supports or includes spam-filtering features.

Low-level filtering

Beyond the application levels like web and email, there is of course the nitty gritty of packet-level inspection. Your firewall is a filter, and operates off IP and/or port ranges to block access. However at the IP level there's much more that you can do instead of just allowing or denying.

Indeed, this is the level at which P2P filtering occurs, usually on ports (as demonstrated by some ISPs in the States to limit bandwidth hogs). However port-filtering isn't exactly efficient, as Bittorrent can be configured to use any number of ports, including those usually reserved for

'trusted' services (such as FTP, email, etc).

Which is why layer seven filtering, also known as deep packet inspection, became popular a number of years ago – if you can't trust the ports, you can trust the packets, and so with this technique packet headers and payload are read as they pass through a router, looking for clues to determine if it is 'normal' traffic or if it matches a defined pattern, like P2P traffic.

You'll notice your Bitorrent client (any decent one, anyway) has an option to encrypt the stream – layer seven filtering is the reason it's there, as encrypting the stream prevents deep packet

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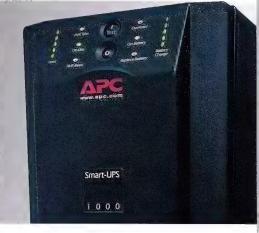
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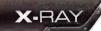
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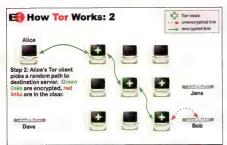
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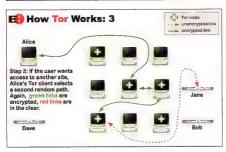
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inspection from doing its job. If the payload can't be determined, then the packet can't be filtered.

Packet inspection on the scale to operate at ISPs (as opposed to a local network, such as at an office) and which operates on all traffic and not just P2P requires some serious grunt, but the hardware is there now and it's a viable option anywhere in the network chain for any ISP or government in the world. It can be used to eavesdrop and enforce censorship, restrict and re-direct traffic, or simply data mine. It's certainly something that the movie studios would love to use (and likely already do) to detect copyrighted material in-flow, although the presence of material is not indicative of a breach, since there are legitimate uses of material online as well (such as a YouTube video uploaded by the

copyright holder themselves).

And don't forget filters can go both ways

– most P2P applications will also support the
use of black list filters to prevent connections
from suspicious sources (spam, spyware, and
companies employed to find copyrighted
material).

Finally, there's *much more* that can be done with filtering at the packet level, such as bandwidth shaping and NAT (network address translation) as well.

Bypassing filters

Naturally filtering can be used for good or evil, and if it's something imposed on you against your will, there are always options to bypass it.

Web proxy services can ferry data on your behalf, bypassing firewalls, emulating a different world region, or simply creating an encrypted connection. Any good proxy should encrypt anyway, as well as provide a degree of anonymity. Indeed some proxies are designed to provide anonymous access, which can be important if connecting from an oppressive country; but as you rely on the end-point proxy to provide this you need to be able to trust the source. This is how Psiphon (psiphon.ca) works, but allows anyone to become a proxy, so you can setup direct links with trusted friends. More

Shield (www.anchorfree.com) and AlwaysVPN (alwaysvpn.com), to connect to VPNs run by these services, albeit with a tradeoff of targeted advertising for the clients.

Tunnelling is another option, and encapsulates one type of traffic within another. In its simplest form, using SSH (secure shell) creates a tunnel between two machines, delivering unencrypted traffic through an encrypted connection.

Tunnelling is similar to VPN when it comes to bypassing filters, but can be set up for specific types of traffic or applications, such as focusing on web browsing and email through a remote system while other traffic exits the local system normally. Examples of tunnelling services focusing on the web include Anonymizer (anonymizer.com) and UltraReach (www.ultrareach.com).

Finally, there are de-centralised services like Tor (www.torproject.org) which can bypass filters and provide anonymity without a direct link to any one server at all; instead data is distributed encrypted among Tor peers, for which there are nodes all around the world. Tor is often used to help people in oppressive countries communicate externally through a distributed, anonymous network.

All of the above is just a snapshot of the various filtering mechanisms you've probably

... filtering can be used for good or evil, and if it's something imposed on you against your will, there are always options to bypass it.

public proxies include Proxify (**proxify.com**), Anonymouse (**anonymouse.org**), ShadowSurf (**www.shadowsurf.com**), and ProxEasy (**www.proxeasy.com**) but there are many *many* more out there.

An alternative to just web-based proxying is setting up a VPN, where all protocols are forwarded to and from a remote machine. Again if you have trusted friends in another location you can set up a VPN using standard networking tools and forwarding to access the internet through a remote machine using a fully encrypted link, though this can take some knowledge to set up. This is why there are services like HotSpot

encountered or used, or will encounter and use if you haven't already. Filtering can be used for positive or negative influences, and while some of it is necessary, like filtering spam, other parts, such as the government's mandatory ISP filtering scheme, most certainly aren't.

True and false

Filtering, especially web and email filtering, isn't perfect. Often false negatives and false positives - where the bad material is allowed through, or the good material is blocked when it shouldn't be, respectively - can impact greatly on the result of a filter. Depending on the application, either could be bad - you don't want a false negative on your net-nanny software if it means your child got exposed to pornography you thought the software was supposed to be blocking. At the same time you don't want false positives when it comes to web filtering because not only will you not get to the site you want, but depending how it's handled you might not even know you were denied it in the first place! Which is precisely one of the many murky realms surrounding the net filtering issue, and just how open to abuse it ultimately is.

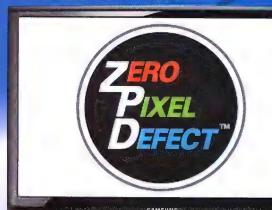


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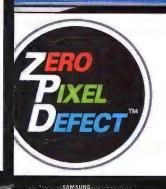
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Does downloading content hurt potential revenue?

ere we go again. Key film industry protagonists including Universal, Warner Bros, Paramount, Disney and Sony as well as Channel 7 have decided to uniformly pull their pants over their heads and sue iiNet for not policing its users and not working to prevent 'piracy', aka allowing them to download movies and TV shows

Expected behaviour by now of the studios but disappointing of Channel 7, which if it had a clue would work with consumers instead of against them, offering a show for download

First up, that 'piracy' word. Lets be clear: piracy is defined as 'robbery', 'illegal violence', and 'hijacking' at sea. It is not downloading a file online. The two are chalk and cheese. Yet, this is the word the studios have almost borne into household use – because it illicits an emotional response. Piracy is bad and criminal and violent, and 'downloading' doesn't quite generate the same feeling in people. This manipulation is subtle but persistant.

It's also not theft by the way, at least of the product, which is often how it is cast. For theft

actually occuring, but this group is the minority.

That's the framework of copyright infringement issues like this. The film industry wants to prevent lost sales, and no one can blame them for it. But let's not throw out the baby with the bathwater and be clear about the context - it's not piracy, it's copying. One is loaded with emotion, the other is fact. It's also not true that a downloadable copy is equivalent to a lost sale, this is only true for one segment of the potential market, and just how large or small that is I don't think anyone knows. including the film industry. So reported figures of the cost of infringement from the industry need to be taken with a grain of salt. As do its claims that ISPs should be the policing and enforcing copyright - which not only passes the buck on cost to ISPs, but also allows the industry to wipe its hands clean.

For theft to occur, there must be a loss of ownership... If you copy my apple, you will have it and so will I.

online at the very same moment it airs publicly, giving consumers a choice on how they watch it. Especially with overseas shows, which it would get immediately, most viewers and especially fans would happily watch them – ads and all – on a download if it meant getting them on time from fast local servers. This is what's known as a *service* and working *with* a medium. This is what makes you money (just imagine adding downloads to your primetime ratings for advertising!)

But I digress – Channel 7 has a different vested interest: TiVo. Yes, rather than make money by tapping into the huge online audience, the channel wants to *restrict* distribution. This is a misnomer of modern business, that control equals profit (take DRM, for example). Unfortunately, until the current generation of suits retires, this mindset will perpetuate

This aside it's worth framing the linet suit and others like it for what they are, rather than what the studios (or even mainstream media) would have you believe.

to occur there must be a loss of ownership. If I have an apple and you take it, you now have it and I don't. But online when a file is copied, downloaded, the original remains. If you copy my apple, you will have it and so will I. No loss occurs with copying. That's the definition of the word.

Of course, the basis of legal actions like this is that a copy = a lost sale, and profit is stolen. But not every copy is equal to a lost sale.

Between a purchasable product and freely downloadable version you can break down the potential market like so: those who will download but *never* buy, those who will download if it's available but buy if it's not, and those that will *always* buy even if it's available to download.

So if a downloadable copy becomes available online, what happens? The last group would always buy it regardless. No sales lost there. The first group would never buy it anyway. No sales lost there either. It's the middle group where an available copy translates to lost sales, where infringement is

Ashton Mills has a very good point.. amills@atomicmpc.com.au





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I/O OF THE MONTH

Solder blobs: The universal panacea

Last night, the network switch next to my desk started making a sparky noise and emitting a 'fried electronics' smell. All of the lights were still on (on the switch, and in the house...), but I unplugged it right away of course. It's mains powered – IEC socket on the back.

But it was still working – even if apparently on fire – when I unplugged it. So it seems to me that it might be fixable. Is this actually likely?

Rob Michaels

If it's an ordinary home-or-smalloffice switch then it's not likely to be economical to repair, if you have to pay someone else to do it.

If you do it yourself, though, it may be a very easy job indeed.

NOTE: If you're new to all this, I suggest you at least build a couple of low-voltage electronics kits before going anywhere near mains power. Also, read the excellent sci.

electronics.repair FAQ, www.repairfaq.org. Disclaimer concludes.

Inside all sorts of mains-powered computing devices is a power supply that takes the mains and converts it to the DC voltages the device needs to run. If there's an intermittent contact on the mains side of that power supply – if, for instance, years of cable tension has cracked the circuit trace next to one of the mains plug's contacts – then 230VAC is more than enough to arc over the little gap, and burn the circuit board. Hence, alarming noise, nasty smell. And a device that may indeed keep working, until the gap gets too big for the arc to cross.

There are many other things that can cause similar symptoms and are not nearly as easy to fix. But you can indeed quite safely unplug your switch, open it up, and look for scorches and blown components on the power supply



There's a mouse in the house. Okay, it's not in the house, it's in I/O. And it looks damn good.

One this big is slightly more challenging.

board. If the problem is just one little arcing gap, you should be able to assault it with a wire brush or pointy scraper to clear away char and expose some clean copper on the PCB to solder to, then bridge the gap with the most elegant blob of solder you can manage. If the gap's long enough to make a solder-blob impractical, you can make a little link out of suitably chunky hook-up wire.

AGAIN: If you drip solder all over the inside of something, or make a solder blob so big that it shorts to the casing when you put the thing back together, please do not sue me, or Atomic.

(I suggest you sue Microsoft. They've got more money.)



A fault this size is easy to bridge

Not sure where to put fluffy dice, Auscar wheels

I have an old 10in car audio subby laying around not being used anymore. I'm building a cheap ghetto style home theatre setup and thought it would be great to hook that sub into my system. It's an old Dominator Sub and Amp which I got for very little cash from Autobarn many many years ago. I was wondering if a computer PSU would be strong enough to power it, or would I need something a bit more beefy. The only other 240-12v converter I have handy is an abundance of old UPS units.

As I said this is a very ghetto setup, so I don't mind being a bit dodgy... as long as it's not a fire hazard.

Joe Harrison

Most car subwoofers are tuned for maximum mid-bass boom and will just add a lot of unfocused rumble to a home theatre system – it might be impressive at first, but it'll probably just annoy you after a while. You can calm them down with a bit of equalisation and get something listenable, though.

What power supply you'd need to run the 12V amplifier in your house depends on how powerful the amp is, and how far up you're going to turn it. For low volumes, any old PC PSU would probably work just fine. Note also that cheap car audio equipment commonly has highly exaggerated sticker power ratings. You'd need to run it with some kind of power meter – the ten-amp range on a multimeter in series with the amp will do for readings up to 120W at 12V – to figure out what it really draws.

Note also that you could easily chop the 12V amp out of the circuit and just connect the sub driver directly to a normal mains-powered amplifier instead. The driver in the sub will very probably be a four-ohm unit rather than the eight ohms that's normal for home stereo equipment, but that's no problem for modern amplifiers; all you'd need to do is set the sub volume lower than you otherwise would.

Motherboard gear ratio

I am about to upgrade my PC at home and I am a bit perplexed about whether spending extra for faster bus speed is going to help performance much. There don't seem to be a lot of useful comparisons of performance around that focus on FSB speed. I could buy the standard 'sweet-spot' priced Intel Core 2 Quad with PC6400 DDR2 RAM and that will all run at 800MHz FSB. Or, I could buy the more expensive Q9x CPU with DDR3 and appropriate motherboard and run at 1333MHz across the board (including the video card as well, so that's elegant). Question is, will the extra buck give me any noticeable bang?

What do I do with my system? Rendering and editing video would be the most demanding thing, but I have a copy of Crysis here I can't even play on my current system. Given I am running an AMD 32-bit Athlon XP single-core at 200MHz FSB I am guessing any upgrade will bring tears of joy to my eyes, but I am one of those people that upgrades every three-plus years so I want this one to last as long as possible.

Mark Tigwell

Bus speed, by itself, won't make much difference. This has been true for the whole of PC history, back to the days when CPUs first started running at multiples of the RAM speed.

Increasing bus speed is still the usual way you overclock a CPU, but overclockers' motherboards always let you decouple other buses from the CPU bus speed, so even if you intend to overclock, it's not vitally important that you have high-speed-capable RAM. Keeping the CPU and RAM more or less 'in sync', overclocked by the same amount, will generally give you more performance, but nothing you'll notice without benchmarking.

If you get the more expensive system with 1333MHz 'across the board', by the way, you certainly won't actually be running the PCle

video card at 1333MHz. The CPU and RAM buses will be running that fast (RAM actually 667MHz, but with two transfers per clock), but PCIe's default clock speed is only 100MHz. The clock speed of the graphics processor may be 1333MHz, but that doesn't matter, because it's completely decoupled from the other buses.

The (relatively) low clock speed of PCIe is not a problem, because multiple 100MHz connections are aggregated for different hardware. PCIe x1 has only one 100MHz lane, but x16 has sixteen, giving tons of bandwidth. Many modern motherboards do let you increase the PCIe speed, but some hardware in any real computer is probably not going to like it.

Any time you're limited by the speed with which data can be pumped to the video card from main memory, performance will probably suck anyway. It's the same as it was back in the AGP days and before; a faster video bus will make performance in this situation less dreadful, but it'll still be dreadful. Bulk data transfer to (or even from) the video card should not occur while you're doing something where frame-rate matters. If it does, you can only solve the problem by getting a video card with more memory, or just winding down the prettiness in your games until the thrashing ceases.

I'd definitely go with the DDR2 system if I were you, if only because DDR2 RAM is so incredibly cheap. DDR3 is much less ludicrously expensive than it used to be, but you're still not going to be getting value for money out of it. And low-end Core 2 Quads have always been great little overclockers, so you'll probably be able to get a cheap one at least up to the sticker speed of the more expensive chip, with no reliability problems or heroic cooling.

If you're doing scientific computation or other stuff that really hits the memory hard, then extra RAM speed is worth the money. Video editing generally doesn't qualify here, because any time it's thrashing the RAM it's probably also thrashing the CPU and/or hard drive, and the multibottleneck design of the modern PC (see www.dansdata.com/io016. htm) means that lengthening just the RAM stage of the barrel will not let it hold any more rendering-speed water.

Wanted: Large knob

I've had a Logitech MX Duo (the MX700 mouse with matching keyboard) for a very long time now. Of course, the mouse is the much better part of the pair, and I like it so much that I am seriously considering replacing the microswitches in the one that I already wore out.

The keyboard is not so great, but I have fallen in love with having a volume control and mute button on it. Since I'm not really interested in the gigantic-delete-button motif seen on most higher-end keyboards being sold today, I'll probably be looking at some sort of buckling-spring model. Which means giving up my media controls - unless an external add-on (similar to a numeric pad) exists.

Does it?

Neil Ansley

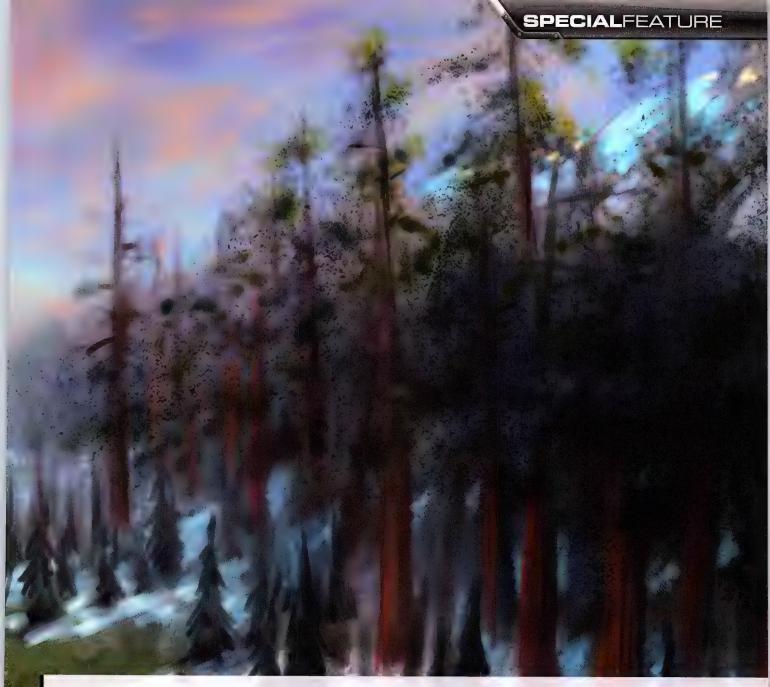
There are plenty of USB controller doodads meant for audio and video producers, but they're huge overkill for this application. I think you might be pretty happy, though, with plain old hotkeys for play/pause/next/last functions (Winamp, for instance, defaults to using Ctrl-Alt plus the Insert/Delete block of keys for these functions; you just turn on Global Hotkeys to make them work), plus a Griffin (griffintechnology.com) PowerMate.



Anyone for Pong?



SPECIALFEATURE WRATH of the LICH KING atemic 20



Liz Skuthorpe takes to WoW's user interface with a very big stick – and so can you with our guide to mods and user add-ons!

lizzard has just released its second expansion for MMO juggernaut World of Warcraft, and since Wrath of the Lich King has now well and truly hit the shelves (and the 80s are already frolicking free in instances all over Azeroth) Atomic is having a look at getting more out of the game with add-ons and modifications.

One of the most interesting things about Blizzard's interface design is that it is intended that users be able to modify the game – to a certain extent – in order to improve their experience of different features, or to include features not designed into the original interface. The basic interface features a map, hotkey bars, and character portraits arranged around the outside of your screen. A pretty simple set up;

often too simple, too intrusive or too ugly for players.

There are a lot of reasons why you might want to modify the interface itself or control other aspects of the game than the developers allow out of the box – such as cool-down timers for your class abilities, to improve the chat functionality in the game, or record damage-persecond output to monitor your performance. Blizzard has made most of this possible in designing the game and plenty of other people have taken the opportunity to create modifications and add-ons to suit their own sometimes obscure purposes.

That said, there are also reasons why you wouldn't necessarily want to use a lot of add-on files as part of your garning. Since these files

are created by third parties and not Blizzard itself, sometimes things just don't work as well as they should. Buggy mods abound and trying to update your existing mods on patch day can be a special kind of hell. At one point popular threat meter add-on Omen caused havoc for raiders as new versions came out daily, and sometimes multiple new versions per day. Since the add-on was still in development raid groups had to ensure that all 25 people were using compatible versions of the same add-on or it wouldn't really work. Next thing you know the DPS are all wiping the raid because they're having difficulty monitoring their threat levels.

We're hoping to save you some of that hassle with this guide.

Lua Louie, oh, yeah.

Warcraft uses a powerful programming language called Lua, which users can take advantage of to write their own files for inclusion as add-ons. This is a lightweight, robust and portable scripting language that concentrates on gaming. It is editable using simple text editors, although there are some programs out there that have Lua specific capabilities. The Lua programming language is a free download useable by anyone who has an interest in creating something to enhance their gaming experience. Most add-on sites feature alpha, beta or final release versions of add-ons, though be warned those early versions may come with bugs so keep an eye on any warnings posted by the developers.

Remember, these gems are often created by players like you, who have other things going on in their lives. Many very good add-ons have left by the wayside when the developer left the game, or moved on to other projects. In many cases these same mods can be picked up by other developers who have an interest in seeing it continue, but unless you can write these things yourself there's no guarantee that your must-have mod will always be around, or kept up to date.

Interface modifications

Like we said, sometimes the plain Warcraft interface can seem cramped – especially if you're playing on a laptop or a small monitor. If you are playing with a small screen the default UI can take up a lot of valuable real estate and you might feel like you can't see what's going on around you in game. UI mods can help reduce this by making it possible to turn off any number of standard Blizzard elements, such as portraits of your character, party or raid, the cast bar, buffs and debuffs and even the minimap. Some mods can also create new button



WoW's regular interface. Servi<mark>ce</mark>able, but you can do so much more with a few <mark>ad</mark>d ons...

elements and make it possible for you to place them around the screen in a way that works best for you.

Interested in raiding? Then you'll definitely want a UI modification of some kind – while the 25-man raids aren't as bad as the old 40-man versions, unless you've got a wide screen monitor having every single raid group plonked in your field of vision is annoying at the least and wipe-inducing at the worst. You'll be able to control elements such as size of the group, power displays, range indicators (great for healers) and control how pets are represented (if at all).

Some class-specific mods also fall into this category; shaman in particular often use totem addons, such as YATA or TotemTimers, in order to reclaim space on their action bars, using a small button grouping that gives access to each of the elemental totem groups.

Popular add-ons: X-perl, Pitbull, Sraidframes

- **X-perl** is the grand-daddy of unit frames for WoW and has been around for a long time.
- Sraidframes is a great unobtrusive mod that doesn't suck your memory dry while offering lots of customization.
- Pitbull is a beast of a raid frame mod; you can customise just about everything, though it also uses a lot of memory.

Bar modifications

One of the limitations of the original Blizzard UI is the limited number of hotkey bars placed around the screen. If you don't use keybound macros to perform simple tasks you would have to open bags or place items in the action bars for easy access. Using a bar mod such as Bongos or Bartender can give you more bars (in some cases up to ten) that you can resize, re-orient and place in locations convenient for your style of gameplay. Most of these modifications are extremely customisable so be prepared to spend hours getting it just right.

Now that you've got your extra bars in the right order and position, you could consider





X-Perl, a popular interface mod, in action.



Omen3 and its config screen.

using an interface modification that effects the look and theme of the bars. Don't like all those rectangular boxes? Try something like Cycircled and you'll get lots of little round buttons instead.

Panel modifications

One of the most useful add-ons (especially if you ultimately use a lot of different mods) is an addition like FuBar or Titan Panel. These addons act as plug-ins for other mods and allow

The WowAce saga

Business is booming for add-on writers it would be if they were making much mon out of it. Well-known site WowAce recently had to shut down its very popular automatic updating program WowAceUpdater because of the massive traffic through its site. Some reports indicated that WowAce went through 350GB per hour on patch days - when users all around the world had to update their addons to work with the newly patched game. Although users were concerned that their favourite mod site was no longer accessible by the general player base and would now have to use popular gaming site Curse, the WowAce developers were quick to point out that WowAce had never been intended as a general use site. It had been intended as a resource for the developers, and the massive download rate would cripple the site before long. The new version of the updater being developed by WowAce developers in conjunction with Curse will also feature a premium version, available for a fee of around \$US3 per month. you to access them immediately. For example you could use FuBar, which creates a narrow bar at the top and bottom of your screen with small icons for each of the mods you have enabled. Things like accumulated gold, profession cooldown timers, map coordinates, dps/hps meters – any number of add-ons are at your immediate disposal. Other panel modifications offer you the ability to move the majority of the interface elements into a paneled section somewhere in the display, leaving the actual game world free of interference from

button, portraits or map.

Some designers offer all in one, noncustomisable UI modifications that set everything in the game window to the creator's specifications. Mods such as Spartan UI will set up the interface without you needing to make any alterations on enabling the add-on – but be warned that you won't be able to make minor changes to the interface yourself if there are elements that you don't like or don't find useful.

Support add-ons

Moving away from the interface itself and to mods that support the gameplay, you'll find there's a huge number of add-ons that can assist players in being more efficient or provide more information about what's happening ingame. A lot of these mods are great for raiders but are just as useful in heroic dungeons and regular five-man groups.

Threat meters are invaluable to tanks, healers and DPS classes as they allow the player to keep an eye on their threat levels for each mob. While DPS classes can keep an eye on the numbers and slow down on the damage if it seems they may pull agro, tanks are able to figure out if they need to use their more threat-boosting abilities in order to keep the mob or boss' attention.

Popular add-ons: Omen Threat Meter

Boss timer mods allow players to keep an eye on the start of scripted events within boss fights either in a dungeon or raid group environment. These are great if you need to figure out when Moroes' next Vanish will occur so you don't blow an important cool-down such as Heroism or Icy Veins.

Deadly Boss Mods, BigWigs, LittleWigs Casters who want to maximise their DPS might use something like the Quartz add-on. This

A lot of these mods are great for raiders but are just as useful in heroic dungeons and regular five-man groups.





Atlas sample boss screen, Lookit all the bits!

addition gives a visual queue for the use of 'StopCasting' macros. The replacement castbar included in Quartz shows when the character's spell or ability has been registered at the server even if the castbar itself has not been 'filled'. The player can then use a stop casting macro in order to begin the cast of their next spell or ability – this add-on is very useful for non-US players with a high-ping.

Class specific add-ons

For players who like to raid or do a lot of PvP there are numerous add-ons that can help with each class' abilities. Some add-ons make announcements when you're performing a specific action, others act as a timer enabling players to keep an eye on the polymorph or know when poisons need reapplying. With their multiple roles hybrid classes – druid, paladin and shaman – get a lot of use out of these kinds of timer mods. Feral druids in shapeshift form can keep an eye on their mana bar using any number of druid timers while enhancement shamans can get a visual queue for Windfury procs in order to maximise their DPS.

Popular add-ons: Mage Annouce, DagAssist, Yata, nature enemy castbar, druid timers, WindfuryFu.

Help for a healer comes in the form of healing mods such as Grid and Clique – and many healers will use both of these addons together. Grid offers a clean interface modification that can be customised to include debuffs marked by colour, range indicators, health deficits and many other features. Meanwhile Clique offers healers a much quicker way to get those heals going by using a 'click to cast' system. By simply mousing over a player's icon in the raid panel, and left clicking

Flavour mods

It's not all about raiding and dps as far as add-ons are concerned, however. You can find a modification for just about any aspect of the game including in-game communications and even ones that help you out if you're a roleplayer.

Even though Blizzard included Roleplay specific (RP) servers as one of the server options available to players, there aren't many ways that RP can be easily included in the functionality of the game. But all is not lost, because some clever clogs have worked out ways of enhancing roleplay opportunities. Most of these include 'flags' that indicate to other people with the same mod that you are a roleplayer, and include fields for detailed character descriptions, titles, surnames etc. and many will also indicate whether you are looking for contact with other roleplayers at that time. Many of these RP mods are being developed to include some level of crossfunctionality, so those people using FlagRSP2 will in future be able to read information created in MvRolePlay add-ons.

But all is not lost because some clever clogs have worked out ways of enhancing roleplaying opportunities.

a priest can automatically cast Greater Heal on the target. Players can customise Clique by specifying which combination of mouse-clicks activates which spells. **The usual suspects:** MyRolePlay, FlagRSP2, Immersion RP

If that's not enough for you then perhaps something like RPHelper2 is what you



Sample PitBull layout in party config mode.

I can't live without...

We asked a bunch of WoW nerds which add-ons they simply couldn't live without as part of their Wacraft experience.

Jossalin; Level 80 Shaman: "Dominoes, Pitbull, Chatter, Grid, Recount, Omen, Altaholic and Yata are my must-have mods".

Kiraleth; Level 78 Death Knight: "I use Recount, Omen and FlagRSP2."

Eithriel; Level 74 Mage: "DagAssist, Mage Announce and mage announce great class mods. Pitbull, Fubar, Decursive, Outfitter, Quartz and RatingBuster are indespensible to my gameplay".

Illithias, Level 73 Warrior: "Well – the majority of the Fu add-ons are minor utility adds – like seeing how much gold I have across my characters, or how long I've got left in flight. Nothing major, but nice to have.

The major UI mods would start with Bartender and Pitbull, my bar and unitframe add-ons respectively. Then Elkano's is my buff/debuff tracker. Mik's is the combat text – I find it much nicer than the standard Blizz one, and you can move the scrolling areas around. I've found Grid awesome for PvP healing, as it shows who's in range better than the standard UI (and Pitbull, for that matter). BigWigs, Omen and Recount are all pretty required once raiding, but could do without if you weren't. Or PvPing. Flag's pretty mandatory for an RP server. Everything else is 'nice, but not a must-have'."





In with the new

The Death Knight class already has a mess of mods and add ons...

One of the most anticipated aspects of the new expansion was Blizzard's inclusion of the first Hero Class for the game; Death Knights.

These characters start at level 55 and players are required to have an existing character of level 55 or above on that server in order to unlock Death Knight availability.

Intended by developers as another tanking class, Death Knights are also competent melee DPS in a party. Playing much like a corrupted paladin using diseases and spells, the Death Knight also generates runic power, much like a Warrior generates rage during combat. Spells and abilities are made available by the pool of runic power and also by six runes etched into the characters iconic Runeblade. Each Death Knight has access to six runes; two unholy, two blood, and two frost. Each rune type is tied to specific abilities and spells.

So, with the inclusion of the new class, mod developers

had a new challenge for the expansion - develop useful class timers that could be written or adapted for the Death Knight's rune system. With a number of developers gaining access to the public beta version of the game, add-ons and mods appeared in the public sphere quite soon after the beta opening. The most common of these are 'rune watch' style mods that allow the player to keep an eye on their rune cool-downs, so they have a better idea of how long until they have access to a particular school of magic.

Just a few Death Knight add-ons...

Rune Hero: this add-on monitors the rune cool-down with a dynamic display that slides runes from one side to another depending on their availability.

Death Watch: tracks duration of ghoul pets as well as existing buffs and debuffs.

Death Knight Alert: this add-on announces ability procs in order to maximise DPS or tanking capacity.



Illithias' UI and list of addons

Ace 1.4.1; Aperture: Atlas: Atlasloot: AtlaslootFu; Bartender4; Big Wigs; Cartographer; Closet Gnome; Curse Profiler; Elkano's Buff Bars; FlagRSP2; FuBar 3.5 - AmmoFu, FuBar, BabelFu, BagFu, BattlegroundFu, ClockFu, CraftTimersFu, DurabilityFu, ExperienceFu, FactionsFu, FuXPFu, HonorFu, ItemBonusesFu, ItemListFu, LocationFu, MoneyFu, PerformanceFu, ProfessionsFu, RegenFu, ReloadUI, TopScoreFu, ToFu, VoiceFu; Grid (not with Illi, but for his healing characters); Mik's Scrolling Battle Text; Necrosis (for the 'lock); Omen; Pitbull; Prat; Recount; Squeenix; TinyTip.

need. This cute add-on lets you set up announcements by your character in 'say', 'party', 'yell' or 'raid chat' without you having to type them out or use a macro every time. For example you can set up an exclamation when you're character gets a critical hit on a mob - functions include limiting the announcements to, for instance, five percent of criticals, otherwise people in your party may boot your noisy toon. Or just not heal you.

Installation

So now that you've decided to try out a couple of these add-ons how do you get them to work? After downloading the add-on or modification (the two best sites to find just about any mod are **www.curse.com** and **www.wowinterface.com**), extract all the contents of that folder, navigating to the World of Warcraft folder on your drive. Open the Interface folder and within that the Add-On folder. This is where all externally created mods live within the program. Finish, and restart Warcraft – at this point you'll probably get some sort of popup offering you options on whatever add-on you've decided to use.

Once you have add-ons installed you'll be able to customise which character uses what add-ons at the Log-in screen. Look for the Add-ons button in the bottom left corner of the log in screen.

No bots!

There's a difference between creating or using a mod/add-on to enhance aspects of the game's performance and gaining an unfair advantage over other players. Blizzard gets serious about these kinds of infringements and using bot programs is one of those. While most add-ons will still require human intervention to perform an action, such as actively using a macro to cast complicated actions, someone still needs to press that hotkey. Sometimes more than once,

Bots remove the human element so players can leave the keyboard and do something else while their character goes about farming for materials on their own. In this instance the 'bot program could target mobs, attack and loot all without any human player being involved. That's what will get you banned, so don't do it!

Similarly, some third-party software could get you into trouble and cause Blizzard to temporarily or permanently ban your account. Earlier this year Blizzard and Vivendi won a case against the creator of farming program MMOGlider and the developers have been proactive in banning accounts found to be using these programs or similar ones.

Such actions can also damage the game economy, or the ability of other players to enjoy the game. Just don't do it.



Jossalin's UI and list of addons

!BugGrabber + BugSack; ACP (disable/enable addons without logging out); Align; Aloft; Altoholic; AtlasLoot; Attrition; Auditor2; BadBoy (spam blocker/reporter); Bagnon, Bagsy; BanzaiAlert; BetterBlizzOptions; BigWigs + LittleWigs; Broker CalendarEvents; Clock; Mail; PvP; Recount; Buffet; ButtonFacade (Caith skin); CCBreaker; Chatter; Chinchilla; ClosetGnome; CowTip; Dominos; ElkBuffBars; EnhancedColourPicker; ErrorMonster; FishermansFriend; Fortress; Fubar – LocationFu, VolumeFu; GatherMate; Gossipmonger; Grid + GridIncomingHeals; HandyNotes; HatTrick; HeadCount; InstanceMaps; LightHeaded; Mapster; MobNotes; MobSpells; nQuestLog; Omen; OmniCC; OPie; Opticon; Overachiever; Parrot; picoFriends + picoGuild; Pitbull; Postal; Quartz; RaidCooldowns; RatingBuster; Rep2; Routes; SellFish; SharedMedia; SimpleBossWhisperer; Skillet; Skinner; StatBlock_Factions; TomTom; UrbanAchiever; VendorBait; XLoot; XPBarNone; Yata.





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HARDWARE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

e've got tech of all kinds, stripes and creeds, this month. From ohmy-god-power-and-cost to hey-that's-pretty-cheap, we've got it all.

Out of the gates Justin Robinson gets down, dirty and overclocked with the lower-specced Core i7 920 CPU from Intel. This is the cheaper version of the Nehalem chip we looked at last month – and we just might like it more! Then there's a the biggest dual-GPU graphics card we've ever seen, a veritable mess of new X58 motherboards to support the shiny-new Nehalem, and even some triple-channel RAM to go with it all!

Plus a vast array of peripherals to whet your appetite for upgrading, and an airbrushed PC you have to see to believe – and next month we'll be giving the case away!

Finally, we come to this month's tech cage match. Times are tight all over, so thinking budget is a wise choice. To that end, we've got an array of sub-\$200 graphics cards that we've put to the test. We look for pure speed, top value, and excellent performance for the price to bring a trio of top cards. Perfect for gamers on a budget - so read on!



O HARDCORE CONTENTS

Intel Core i7 920 CPU	30
Gainward 4870 X2	31
Goes Like Hell graphics card	
MSI DKA790GX Platinum mobo	33
MSI X58 Eclipse	34
MSI X58 Platinum	35
ASUS Rampage II Extreme	36
GIGABYTE X58	38
GIGABYTE EP45-UD3P	40
Coolermaster N620 CPU cooler	41
Corsair Triple Channel RAM	41
Xonar HDAV sound card	42
Verbatim Rapier VI gaming mouse	43
Razer Salmosa	43
Orbita mouse	44
Antec 1200 case	45
Deus Ex OC PC	47
Lian LI PC-K8	48
HEAD2HEAD	50
Sub-\$200 graphics cards	

Justin Robinson looks at bang-for-buck

pixel-pushing solutions!





Core i7 920 2.67GHz

An astounding budget chip, with a lot of potential.

Price \$540 Supplier Intel Website www.intel.com

Specifications 2.67GHz quad core; 45nm manufacturing process; 'Bloomfield' core; 32KBx4 L1, 256KBx4 L2, 8MB L cache; 20x multiplier; 133MHz QuickPath Interconnect; 130W TDP.

ollowing on from our Nehalem architectural walkthrough last month, we felt that while the extremely high-end chips are good fun to read about, they're not exactly practical for most people. Which brings us to the Core i7 920, a decidedly budget-esque (we say esque because it's still rather pricey) chip that runs at a stock frequency of 2.67GHz.

It's built on the same 45nm process as all the rest of Intel's recent lineup, and includes a decidedly gargantuan 8MB L3 cache, which is shared between the four cores. Each of these cores is Hyperthreaded too – you can run two threads on one core, effectively giving you eight threads to work with! This chip runs on the LGA1366 socket, which unfortunately means that you'll have to upgrade to be able to take advantage of the new architecture – but luckily there's no less than four X58 mobos in only a few pages!

The TDP of the i920 is 130W, which is the same as every other Core i7 chip currently out. While the CPU might not always be generating this much heat, this is the maximum amount that it is designed to generate at stock settings – overclocking pushes this value right out the door, throwing suitcases at it rudely. The QPI speed is the stock 133MHz, and the multiplier is 20.

This chip is physically larger, as is the socket, so those who like cooler or quieter systems will have to grab the correct mounting kit, or a cooler that specifically supports the socket – we're using a Thermalright Ultra 120 Extreme with a mounting kit.

Bumping stock speeds into the BIOS, making sure everything was chugging along smoothly, we booted into Vista x64, and began testing. Stock results here are slightly disappointing, returning scores slightly lower and times slightly higher than an E8600 at stock. Of course, the multithreaded applications rocketed through the tests, giving very good improvements

- video encoders listen in!

Kicking the speed up a notch, we managed to shave a few more seconds off, and add more points, finally beating the E8600 in singlethreaded apps when we reached a speed of 3.2GHz – but we didn't stop there. Continuing to add voltage where needed, coaxing more out of this CPU from the QPI, and using all the tools at our command, we squeezed a phenomenal final result of 3.9GHzI

This is a 46 per cent increase over the stock clocks, and required a QPI speed of 190. Granted, we had to run 1.575V through the core, which isn't really safe to be running daily. Sure, we had the QPI at 1.4V, but that's all part of getting it nice and stable – something you can easily do with some decent watercooling and good airflow!

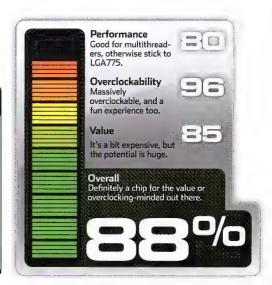
At this speed, our multithreaded performance was rather impressive, giving 21622 in Cinebench, and 6.329 seconds in wPrime. Stranger still, we actually got a faster run of singlethreaded wPrime with the i920 at 3.9GHz than the E8600 at 4.5GHz!

So if you're going to be running at stock speeds, with a stock cooler, and running singlethreaded applications almost exclusively, then there's no real point to get Core i7. But if you grab some decent cooling, really work the speed of the chip, and run multithreaded apps – the difference can be earthshattering. You'll even notice a speed increase in windows – zipping around without thinking about running concurrent tasks is a very releasing feeling.

We're tempted to recommend this chip over the more expensive i965, for just that reason. With a street price roughly a quarter of that of the i965, and overclocking potential up the wazoo, this really is a chip that will keep you happy for a very long time – it might even last you a year before the upgrade itch begins again!

Core i7 920 2.67GHz

COIC IT SEO EIGTGITE			
1920	133x20; DDR3-1066 8-8-8- 24; 2.67GHz	150x20; DDR31200 8-8-8-24; 3.0GHz	160x20; DDR3-1280 8-8-8-24; 3.2GHz
PiFast	31.13s	29.45s	27.84s
wPrime 32M – single thread	41.828s	39.545s	37.156s
wPrime 32M – multi-thread	8.687s (4.82x efficiency)	8.171s (4.84x)	7.672s (4.84x)
CineBench R10 64-bit – single thread	3944	4211	4462
CineBench R10 64-bit – multi-thread	16289 (4.13x efficiency)	16984 (4.03x)	18026 (4.04x)
Everest Read	12168MB/s	12584MB/s	13860MB/s
Everest Write	9769MB/s	10859MB/s	11583MB/s
Everest Latency	45.3ns	42.5ns	39.7ns



Gainward 4870X2 "Goes Like Hell" Edition

A quirky behemoth of a card with an awkward name.

Price \$899 Supplier Gainward
Website www.gainward.com
Specifications 790MHz core; 950MHz memory
(1900MHz effective); RV770 core X 2; 1600 shader units;
2GB GDDR5; 256-bit memory interface; triple!! slot PCB
with active cooling; 6-pin and 8-pin PCle power connectors

h. Our. Word.
This card is so gilargically hunourmous that even normal words can't be used to describe just how bigassive this card really is. Think of your normal dual-slot cooler. Then add another slot to it, as well as a large aluminium plate on the other side, and you'll come close to knowing what this card is like.

Specs are pretty impressive, with twin RV770 cores bumped up by 40MHz, giving us a final speed of 790MHz. The 2GB of GDDR5 memory on a 256-bit memory bus, already getting a huge amount of bandwidth and performance at stock speeds of 900MHz on most other cards, receives a large boost of 50MHz – though you'll find out in a minute why that isn't necessarily a good thing.

As you open the packaging to this cooler, the first thing you notice is the front of the card, packed in very thick foam. Everything seems normal, as you look at the card, and slowly lift it out of the foam – but it just keeps coming! We had such a shock at the sheer size of this thing when it came out that we damn nearly wet ourselves. Starting at the top layer of this cooler, Gainward have placed a bright red sticker over the plastic shroud that only serves the purpose of holding the dual 80mm fans in place (and

looks admittedly kind of cool). These fans work in tandem to pull cool air in, and through the two separate heatsinks, one on each core. The heatsinks consist of a copper base, with two thick heatpipes that curve upwards

into a solid block of aluminium fins.

With the cores taken care of by these decidedly large heatsinks, the memory chips receive attention as well, covered by a small aluminium plate with raised fins, that also covers the power regulation. This bolts through the PCB of the card to another piece of aluminium, sandwiching the card in the middle. The PCI bracket is ventilated, but this doesn't actually help any of the heat escape through there – it's all going to be dumped into the air of your case.

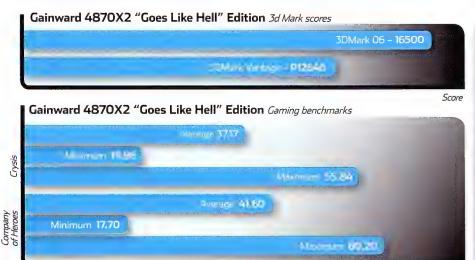
Sure, the card makes only 56.1dBA and manages to keep temps down to 56 degrees while idling. Sure, this only reaches 68 degrees (and 66.9dBA) under load. But that is only the temperature of the cores – there's another issue far greater with this card. The aluminium memory plate on the back of the card heats up incredibly under load, so much so that the SATA cable resting against it began to melt! Sheer heat from the overclocked memory and cores just could not be handled by this heatsink, and this would definitely interfere with mobo cooling – just imagine having that hotplate sitting there!

So what, apart from heat, does this small

5.3% overclock on the cores give us? Almost nothing. We recorded an increase of 118 more 3DMark06 points, and 149 more Vantage points, which for the sacrifice of more money, huge amounts of heat, AND three slots taken up is totally not worth it. Admittedly performance is very nice, but you can expect this of pretty much any 4870X2 – it certainly shouldn't be this one.

Atomic Cooking Tip

If you are mad enough to buy this card, we've got some cooking suggestions for you. Drizzle some olive oil (or thermal goop, in a pinch) on the backplate of this card. Slice some bacon, and crack an egg on top, placing the bacon on as well. Play a game for two minutes, then remove and serve. Food produced may be poisonous or hazardous to health – but at least you're getting your money's worth out of the card!



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Hardcore Gaming Systems

TORNADO

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TYPHOON

Intel® Core™ 2 Duo E8400 CPU 3.0GHz Overclocked to 4.0GHz Intel® P45 Motherboard Corsair Dominator 2GB 1066MHZ DDR2 1 x ATI HD4870 512MB GDDR5 640GB RAID 0 HDD Space





Blu-ray Optical Drive

STORM

NVIDIA 790i Ultra SLI Motherboard Corsair Dominator 4GB 1600MHZ DDR3 2 x NVIDIA GTX280 1GB SLI

Alphacool Water Cooling System 2 Terabytes RAID 0 HDD Space

Intel® Core™ 2 Extreme QX9560 Quad Core CPU 3.0GHz Overclocked to 4.2GHz



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MSI DKA790GX Platinum

Orcs on the box means a gaming mobo. We hope...

Price \$245 Supplier MSI Website www.msicomputer.com.au

Specifications Socket AM2+; AMD 790GX chipset; ATX form factor; 2x PCIe x16; 2x PCI; 2x PCIe x1; 1x EIDE; 5x SATA: DDR2-1066

es, we really mean Orcs. While we're not quite sold vet on the merits of a motherboard that claims to aid your gaming, we are very sure that this one comes with a bevy of exciting features.

Slapped (albeit gently) onto this board is the 790GX chipset, which includes both an integrated graphics core (roughly equal in performance to what would be a HD3300), and 32 PCIe V2.0 lanes allowing full, unrestricted Crossfire in the two present slots. This is covered by a heatsink that's oddly reminiscent of a steampunked bird's nest, which is very cool (see what we did there?). Sadly there is no fan included, but the temperatures did not get overly warm under use, and even slight airflow here will prove sufficient for good stability when overclocking.

There is also plenty of room around the CPU socket and RAM, meaning that installing coolers and modules will be relatively effortless (though taller modules might have a problem fitting underneath larger heatsinks). The 24and 4-pin power connectors are in the usual place, and there are right-angled SATA and a solitary IDE port along the right-hand side of the board. Our most favourite of features is down in the corner - buttons for power, reset and clear CMOS. These buttons make it incredibly easy to test, as well as benching sessions outside your case.

Along the bottom of the board are the usual headers, as well as the floppy port that seriously needs to be taken on a holiday and 'forgotten', never to return. MSI has picked a pretty decent array of expansion slots as well, covering you for pretty much any option you're after (though as always dual-card setups will need a bit more planning if you're aiming to have a RAID or sound card as well). All the usual favourites in the form of Realtek audio chips and circuits are present to offer acceptable sound quality, though it can't really



come close to a dedicated card.

Back panel options are comprehensive as well, with six USB, PS/2, VGA, HDMI/DVI (only one of these at a time), Firewire, eSATA, Gigabit Ethernet, 7.1 channel analogue audio and an optical port. And if you're one of those obsessive-compulsive USB gadget hoarders, then you're covered with the three headers, giving up to six more ports (moar ports? -ed).

The PCB of the mobo is a rich chocolatey colour, and is adorned with solid capacitors in three different colours and flavours. Also present are ferrite chokes, but this is mostly standard fare in a decent motherboard. What isn't standard, however, is the little red and white switches between the PCle slots, which allow hardware-based overclocking of the HTT bus up to 20 per cent. This is kind of cool, but serious enthusiasts will likely eschew this in favour of the trusty BIOS. Regardless of which method you use, this board is quite a good little overclocker.

BIOS options are relatively clear (though the prevalence of typos and vague explanations may put off newcomers initially), though voltage

options are very limited. We only had a choice of 1.3V, 1.35V or 1.4V for the CPU and chipset - this is extremely restrictive when trying to fine-tune an overclock, and definitely worked against us. We did manage to hit a HT speed of 248, giving us a speed of 3224MHz on the CPU, though we know both the chipset and CPU can be pushed further, and were limited by the voltage (voltmodding this board would definitely increase headroom, however).

The bundle does lift this board slightly, providing all the cables you'd need, as well as Molex to SATA power - always handy for those with older PSUs. Overall this is a solid offering, but needs more precise overclocking options to make it a real killer. (6) JR

Performance Good for an AMD board.	6 3
Value Price is right.	(=) (=)
Features Smorgasbord, Tasty!	92
Build Solid, no large flaws.	
Overall Needs some work, but perfection is close.	
85	0/0
	Good for an AMD board. Value Price is right. Features Smorgasbord. Tasty! Build Solid, no large flaws. Overall Needs some work, but

MSI DKA790GX Platinum			
Phenom 9950	200x13; DDR2-800 5-5-15-24	217x13; DOR2- 8665-5-15-24	230x13; DDR2-920 5-5-15-24
CPU Free Benchmark2	51.79	47.49	44.89
wPrime 32M	60.465	54.33	51.964
CineBench R10 64-bit – single thread	2759	2998	3186
CineBench R10 64-bit – multi-thread	7669 (2.85x efficiency)	8401 (2.80x)	8526 (2.68x)

MSI X58 Eclipse

Sadly not large enough to blot out the sun.

Price \$610 Supplier MSI Website www.msi.com.au

Specifications Socket LGA1366; Intel X58 chipset; ATX form factor; 3x PCle x16; 2x PCl; 2x PCle x1; 1x EIDE; 10x SATA; DDR3-2133

s the first of two MSI X58 boards this month, this one is most definitely the more premium of the two – in price and features. But does the performance justify the extra cost? Well, as you're about to find out, not really.

With the trusty X58 chipset plugged into this imposing black board, and solid caps as far as the eye can see, this board has a cooling array that's not only aesthetically pleasing, but also serves a practical purpose. It's just a shame that under a heavily overclocked load, it skyrocketed to a blistering 79 degrees Celsius! Granted, this was without direct airflow, but for those without just that this could definitely be a mark on an otherwise capable overclocking experience.

With a fan (or three) pointed towards the cooling array, we pushed the board to a maximum stable QPI of 162, giving us a speed of 3.888GHz. This is pretty average, and certainly nothing special, but it's not terrible either. One upside of paltry chipset cooling is that there is plenty of room around the LGA1366 socket for large heatsinks, and definitely more than enough room for watercooling (when we start to see waterblocks, that is). Triple channelled DDR3 memory, with six slots available, has plenty of room for larger modules, and a decent spacing from the socket for if you've got a large heatsink there. The power connectors for the board and CPU are all present, and located in the best areas for good cabling inside a case.

Six right-angled SATA ports, as well as four more vertical ones are along the right-hand

side of the board, joined by a right-angled IDE socket, handle connectivity. IDE is still a handy thing to have, as many older DVD and HDD drives are still perfectly functional, or have essential data on them. Front panel connectors (complete with positive pin crosses and colour coding – this makes it ever so easy to use), USB, power, reset and Firewire are along the bottom of the board, along with a small red box with switches on it to allow hardware overclocking of the QPI bus. A small port is also located between the bottom PCle slot, and the SATA ports, into which connects a VFD screen that shows POST information at boot, and the MSI logo otherwise.

The expansion slots are the usual affair, but there are two slots between the top and the middle cards – this is great for allowing plenty of airflow. There are five system fan headers and one CPU fan header on this board, so you've got no excuse for not maintaining this

amount of airflow either.

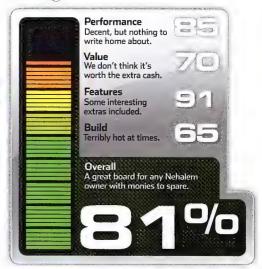
Moving to the back panel, there are eight USB, two Ethernet, two eSATA, Firewire, two PS/2 ports and a clear CMOS button. You might have noticed that there was no audio jacks or headers on the board – that's due to the Xtreme Audio Card bundled in. This uses the CA0110-IBG audio chip to provide sound, as well as the audio headers, and plugs into the PCIe 1x slot. This isn't a full-fledged X-Fi chip (the CA20K1-PAG), but it is a noticeable step-up over standard onboard audio. There's a convenient PCIe 1x slot just above the top x16 slot that affords plenty of room for this card, but also room for longer sound cards if you'd prefer something better.

While it's not going to break any overclocking records, this board is quite dependable, and comes with a host of handy features – it's just up to you to decide if they're worth the extra dough.

JR

MSI X58 Eclipse

1965	133x24; DDR3-1600 8-8-8-24; 3.2GHz	150x24; DDR31500 8-8-8-24; 3.6GHz	160x24; DDR3-1600 8-8-8-24; 3.84GHz
PiFast	26.28s	23.50s	21.95s
wPrime 32M – single thread	37.125s	33.109s	30.813s
wPrime 32M – multi-thread	7.719s (4.81x efficiency)	6.86s (4.83x)	6.391s (4.82x)
CineBench R10 64-bit – single thread	4534	5009	5479
CineBench R10 64-bit – multi-thread	19105 (4.21x efficiency)	20495 (4.09x)	21655 (3.95x)
Everest Read	17507MB/s	16635MB/s	17182MB/s
Everest Write	13962MB/s	13495MB/s	14389MB/s
Everest Latency	31.6ns	32.8ns	33.2ns



MSI X58 Platinum

A dream board for a dream chip.

Price \$515 Supplier MSI
Website www.msicomputer.com.au

Specifications Socket LGA1366; Intel X58 chipset; ATX form factor; 2x PCle x16; 2x PCl; 3x PCle x1; 1x EIDE; 8x SATA; DDR3-2133

We've been fawning over both Nehalem and the new X58 mobos for the past three months in the Labs. We'd even go so far as to say that we've been dreaming about it – and this just might be the dream board for you.

The back panel is elegantly arranged, with two PS/2 ports, Firewire, Optical, eight USB, eSATA, clear CMOS, two Ethernet ports and 7.1 audio ports. This is extremely opulent, but at the same time,very welcome – you'll be able to connect just about anything you'd like back here!

The expansion slots, located in their usual place, are relatively well thought out and have plenty of room for Crossfire or SLI with dual slot cards. There are also three fan headers here - great for rear exhaust fans, or sidepanel ones. The board battery will be blocked by the top card, but that's where the clear CMOS button comes in handy. Along the bottom of the board are two more buttons - power and reset. For those who like an out-of-case experience when 'clocking, this is a very handy feature. Next to these buttons are three little switches, which facilitate overclocking of the board. Still, we'd prefer to stick with the BIOS. Two USB headers are also here, which can give you up to four more ports. Front panel and case headers are in the lower right corner, and the positive pins are noted - this is a godsend for getting the LEDs working the first time.

Right above this is a little socket that looks like an anti-header. Rather, this is where an included POST screen plugs in, giving you access to a VFD-styled screen if you want it – a great and actually useful idea. Another nifty feature is the right angled IDE and SATA ports



(though two SATA are the typical vertical ones), keeping cabling out of the way of large cards, and easing cable management considerably. There are another two fan headers just behind these SATA ports, which are good for intake fans (or if you just like having a header there for +12V emergencies – this happens more often than you'd think).

The 24- and 8-pin power connectors are all in the usual places, and the six DDR3 ports are quite typical, with the black slots being dominant (and needing population before the more submissive blues). Funnily enough, something about the latches on these slots feels much better than any other board we've used to date. The CPU socket has room a-plenty for large coolers, and has a small forest of solid caps around it. Oddly, the CPU fan header is placed a little way away from the socket, just above the DRAM slots. This still works fine, but is just rather different.

One area where this board does tall down slightly is the Northbridge cooling, in that it really can't cope with an overclocked system and no airflow. At only 3.6GHz, we recorded a temp of 74 degrees! This amount of heat is really quite bad for stability, and we couldn't run benchmarks until we introduced an 8cm fan, which brought temps down to the low fifties — much better. Another little quirk was that the i965 chip was detected with a QPI speed of 4.8GT/s, when the actual speed should have been 6.4GT/s. We fixed this easily via the BIOS, but it's just something to be aware of until they fix this in a BIOS update.

The BIOS itself is very succinct with its options, and there's plenty of room to tweak; we hit a maximum stable speed of 163 QPI, and could have easily gone further if not for the hot northbridge holding us back (even with a fan). This is a very good board, and you really won't be disappointed if you pick it up.

MSI X58 Platinum

1965	133x24; DDR3-1600 8-8-8-24; 3.2GHz	150x24; DDR3 1500 8-8-8-24; 3.6GHz	160x24; DDR3-1600 8-8-8-24; 3.84GHz
PiFast	26.41s	23.84s	22.23s
wPrime 32M – single thread	36.982s	32.908s	30.938s
wPrime 32M – multi-thread	7.653s (4.83x efficiency)	7.22s (4.56x)	6.73s (4.83x)
CineBench R10 64-bit – single thread	4532	5039	5339
CineBench R10 64-bit – multi-thread	18612 (4.11x efficiency)	20700 (4.11x)	22118 (4.14x)
Everest Read	14777MB/s	13191MB/s	14508MB/s
Everest Write	11976MB/s	10951MB/s	11714MB/s
Everest Latency	36.0ns	40.8ns	38.5ns



ASUS Rampage II Extreme

Half pencil case. Half motherboard. Half Christmas tree. Totally awesome.

Price \$700 Supplier ASUS Website www.asus.com.au

Specifications Socket LGA1366; Intel X58 chipset; ATX form factor; 3x PCle x16; x PCl; 2x PCle x1; 1x EIDE; 7x SATA; DDR3-2133

SUS has always produced boards with a slight touch of eccentricity, and definitely a lot of innovation. This latest board takes all its previous triumphs, and takes them for a deepsea dive without an oxygen tank.

Starting with the back panel, and the six USB, eSATA, Firewire, Ethernet, PS/2 and clear CMOS button, there's something missing. Audio, of course! Luckily this has been provided by a riser card, labelled with 'X-Fi'. Sadly, this doesn't actually have anything more than the standard AD2000B audio chip, and is instead emulated through included software. This isn't too much of a problem with Nehalem, since there are oodles of CPU cycles to spare - you won't notice the performance drop.

The CPU socket is intricately designed, with ferrite chokes and solid caps colourcoordinated with a matching cooling array that has more than enough room for the largest coolers. A small silver chip is located next to the CPU socket, but we'll get to that one slightly later. All the DDR3 slots have plenty of space around them, and you can easily swap them in or out with a graphics card installed. The 24- and 8-pin power connectors are in the usual places, as are the right-angled SATA and IDE ports. All the usual headers are along the bottom of the board, as well as two removable BIOS chips - just get a pair of pliers and pull gently. One is for redundancy, in case you fry the first chip.

All the expansion slots are surrounded with a great many surface-mounted chips, each one adding another feature to this jam-packed

board. A total of seven fan headers are located around the board as well - very handy for those extreme rigs that need lots of air movement.

With all the usual features detailed, this brings us to the crux of the review - the 'Extreme OC' dynamic overclocking system. This is a chip mounted just underneath the ROG logo on the chipset cooling; working in unison with the silver chips, four buttons, a small joystick and the LCD post screen, this allows voltages and clock speeds to be changed on the fly. The screen displays your current selection, and you're able to change the QPI speed and voltage, as well as the CPU, DRAM, NB, and

Not only does this mean overclocking while inside the OS, but it also means that you can set up profiles for gaming, benching or whatever you'd like, and easily switch between them. ASUS has even included a row of eight voltage measurement points on the motherboard, for those extreme souls amongst you who put this board through things that it doesn't like very much (LN2 is cold!), or those worried about excessive Vdroop.

There are also lights in pretty much every area of the board, showing load, presence of power, or just lighting up for sheer joy. Each of these are controlled via the BIOS, so if they annoy you, (such as the ROG logo on the chipset pulsating annoyingly when the system is not running) just turn them off.

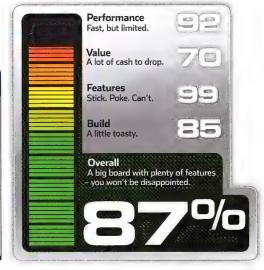
We've covered the mobo and the tree, so all that's left is the pencil case. On the chipset cooling array, (the large flat rectangle covering the southbridge and the NT200 chip) is the sentence "Designed for Overclocking, Overclocked by _ is pretty damned odd for a motherboard, and they don't even include the sheet of cardboard letters! Nor a marker. Ripped off!

With all these features crammed into such a small space, heat is a problem. The entire cooling array will get very hot without airflow, and if your case is upside-down ATX style, you're going to have problems at the SB area - heat rises! Performance was quite good, with all benchmarks giving solid scores, and the board reaching a maximum overclock of 162, giving us 3.888GHz - this was the same limit through either the BIOS or the overclocking system.

The bundle is very good, and you couldn't ask for more features. We'd recommend this board to those serious about their overclocking precision, or if you just need a board that does it all. (JR

■ ASUS Rampage II Extreme

ASOS Rampage II Extreme			
1965	133x24; DDR3-1066 7-7-7-20; 3.2GHz	150x24; DDR31066 7-7-7-20; 3.6GHz	160X24; DDR3-1066 7-7-7-20; 3.84GHz
PiFast	26.60s	23.57s	22.17s
wPrime 32M – single thread	36.88s	32.871s	30.901s
wPrime 32M – multi-thread	7.721s (4.77x efficiency)	6.896s (4.76x)	6.44s
CineBench R10 64-bit – single thread	4573	5096	5465
CineBench R1064-bit – multi-thread	18458 (4.04x efficiency)	20850 (4.09x)	21370 (3.91x)
Everest Read	13384MB/s	14310MB/s	14127MB/s
Everest Write	11973MB/s	13439MB/s	14335MB/s
Everest Latency	38.9ns	38.0ns	36.4ns



The Extreme to Beat all Records



The recent launch of Intel® Core i7 (code name Nehalem) processor, and Intel® X58 Express chipset brings a brand new evolution to the computing architecture and delivers an amazing performance break through from past processor generations. This has been made possible by the new micro-architecture, with integrated memory controller inside the processor die and three channel DDR3 promising a higher memory bandwidth and lower latency. Quick Path Interconnect, known as QPI, replaces the Front-Side Bus and eliminates the communication bottlenecks between processors as well as between the processor and chipset. This new inter-processor and processor-chipset interconnect will allow for seamless integration and connection of processor with the chipset.







GIGABYTE has recently announced an extreme overclocking motherboard named the GA-EX58-Extreme that was designed from the ground up to unleash

the awesome power of Intel's Core i7 processors. With significant bandwidth increase of QPI over FSB, 192bits tri-channel DDR3 memory support that delivers 50% memory bandwidth enhancement and featuring extensive overclocking capabilities, the GIGABYTE extreme overclocking motherboard delivers the highest level of performance computing you've been waiting for.

The GIGABYTE GA-EX58-Extreme is yet another example of GIGABYTE engineering at its best with its revolutionary GIGABYTE Ultra Durable 3 design featuring 2 ounces of copper for both the Power and Ground layers which dramatically lowers system temperature by delivering a more efficient spreading of heat from critical areas of the motherboard such as the CPU power zone throughout the entire PCB. GIGABYTE's Ultra Durable 3 also lowers the PCB impedance by 50%, which helps to reduce electrical waste and further lowers component temperatures. A 2oz Copper layer design also

provides improved signal quality and lower EMI (Electromagnetic Interference), providing better system stability and allowing for greater margins for overclocking.



Gamers, get ready for some serious frame rates as the GIGABYTE GA-EX58-Extreme delivers 3 PCIe x16 Gen2.0 slots, supporting both ATI CrossFireXTM and 3 Way NVIDIA





SLITM. Whether enabling the most powerful graphics configurations for extreme multi-GPU gaming, or multiple display support for up to 6 monitors, the GIGABYTE GA-EX58-Extreme has your 3 way graphics action covered.

In addition to the "cool blue" new look and feel of the GIGABTYE X58 Series, the GIGABYTE GA-EX58-Extreme motherboard now features the revolutionary new GIGABYTE Hybrid Silent-Pipe 2, a fusion thermal



solution that combines
GIGABYTE's proprietary
screen cooling technology,
external heat sink and liquid
cooling with chipset water
block to deliver maximum
thermal performance.



Breaking overclock records is what GIGABYTE GA-EX58-Extreme motherboard is all about, with friendly overclocking features such as Precision OV (Hardware Overvoltage Control IC), Debug LED and onboard Power and back panel clear CMOS switches. Additionally, the GIGABYTE GA-EX58-Extreme feature comprehensive BIOS options for reaching higher limits with more detailed settings, including CPU frequency stepping, Over Voltage increments, memory multipliers and advanced memory timing controls, making it easier than ever to tweak the highest levels of extreme overclocking performance from your system.







www.gigabyte.com.au

GIGABYTE

the board.

GIGABYTE EX58-EXTREME

No more pink DRAM slots!

Price \$509 Supplier GIGABYTE Website www.giga-byte.com

Specifications Socket LGA1366; Intel X58 chipset; ATX form factor; 2x PCle x16; 2x PCl; 1x PCle x4; 1x PCle x 8 (electrical); 1x EIDE; 10x SATA; DDR3-2133

s a GIGABYTE rep proudly proclaimed about this latest board, the DRAM slots are no longer pink. This was a major point of contention for many, as they seemed to think that the colour didn't match their clothes (either that, or they just didn't like it). Well, the colour scheme is now a very impressive blue, white, grey and orange, and looks extremely attractive. Looks, as we'll find in a minute, are not even half the story.

Ten right-angled SATA ports are all lined up along the right edge of the board, a literal plethora of ports to give you maximum flexibility when designing your next rig. There's also a little LED POST screen just below these, which shows alphanumerical codes that let you know which part of the boot went haywire. Two fan headers are also along this side of the board, giving you easy expansion.

Mobo power is provided by the 24-pin socket, and the 8-pin is at the usual location. Six DDR3 slots (appropriately coloured, of course) are able to be played with, without removing larger graphics cards first. In the topright hand corner, you'll see power and a reset button – a really great placement that means you can still use them even when running Tri-SLI. There's a huge bank of surface-mounted LEDs here as well, pumping out more photons than James Bond does puns. We're of the notion that the more light that motherboards can flood the case with, the better.

The CPU socket has a voluminous amount of space around it, with plenty of solid capacitors and chokes to ensure quality power. Perhaps the most interesting part of this area is the chipset

here, but we're too distracted by that huge heatsink to care. cooling. A long heatpipe Expansion slots receive good treatment as snakes across

connecting the power regulation with a heatsink on the X58 northbridge, and continuing to the NT200 and southbridge chips. Not only that, but the northbridge itself has the option of using watercooling, by simply connecting the existing barbs to the loop. And, to outdo its own excessive cooling, GIGABYTE's also included a large bolt-on heatsink too, that takes up two expansion slots but provides a much larger surface area over which to dissipate the heat. One might wonder at the effectiveness of this when the X58 chip makes so little heat, but keep in mind that all the power regulation and extra NT200 chip do make a significant amount, and it does help stability - especially under load.

The back panel is comprised of eight USB ports, two Ethernet, two PS/2, Firewire, Optical/Coaxial out, 7.1 channel analogue audio, Firewire, and a clear CMOS button. eSATA would have been a nice inclusion back well (though for those colour purists out there the orange probably won't do it for you), with plenty of options. Space is at a premium if you use the add-on heatsink, so keep that in mind if you want a dual-card rig with another card. The bottom PCIe slot is the physical 16x, but is only electrically 8x.

The audio port is nestled between the backpanel audio sockets, the chipset cooling, and the add-on heatsink - this makes it very hard to plug in or out in a case! This seriously needs moving, unless you've got extremely thin and elongated fingers.

All the cooling on the board allowed us to get to a stable QPI of 165, and the BIOS was very precise and easy to use. This is a great result, and anyone building a Nehalem system would be very happy with the overclocking performance. (6) JR

GIGABYTE EX58-EXTREME

i965	133x24; DDR3-1600 8-8-8-24; 3,2GHz	150x24; DDR3 1500 8-8-8-24; 3.6GHz	160x24; DDR3-1600 8-8-8-24; 3.84GHz
PiFast	27.20s	24.52s	22.97s
wPrime 32M – single thread	36.627s	32.034s	30.923s
wPrime 32M – multi-thread	7.548s (4.85x efficiency)	6.831s (4.69x)	6.439s (4.80x)
CineBench R10 64-bit – single thread	4574	4945	5408
CineBench R10 64-bit – multi-thread	18703 (4.09x efficiency)	21074 (4.26x)	21894 (4.05x)
Everest Read	17399MB/s	16109MB/s	17060MB/s
Everest Write	14076MB/s	13439MB/s	14334MB/s
Everest Latency	32.5ns	34.4ns	32.3ns











innovation with style;

Drmos

GreenPower Highest Efficiency



Behold the RapidBoost Best Performance of Computing

Introducing the upcoming MSI Eclipse series motherboard equipped with the exclusive 2nd Generation DrMOS offereing superior power-saving and performance



The Industry's First Expanded the DrMOS on Chipset

In order to maximize the performance and provide a stable and adequate power supply in the latest generation of platforms. MSI Eclipse series motherboard is equipped with the 2nd generation DrMOS which is recommended by Intel and most suitable for the processor's power supply. It provides super-stable power supply capacity to enhance the bandwidth of new platform, and strengthen the energy-saving capability other than the processor as well: MSI Eclipse series motherboard provides unprecedented quality of excellent power supply design.



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The 2nd generation DrMOS can be operated under low-temperature and is exclusive for MSI motherboard. Therefore, MSI Eclipse series motherboard utilizes the DrMOS advantages and changes the heavy and single heat-pipe thermal design into two, achieving a balanced system temperature purpose, which can suppress the temperature of 45°C. Even in overclocking operating environment, the unique split thermal system can still control the system temperature of 80°C. With the excellent cooling effect, it can pass even the extreme performance test.















GIGABYTE EP45-UD3P

Now with twice the copper!!!!leleven!

Price \$240 Supplier GIGABYTE Website www.giga-byte.com

Specifications Socket 775; Intel P45 chipset; ATX form factor; 1x PCle x16; 1x PCle x8; 2x PCl; 3x PCle x1; 1x EIDE; 1xFDD; 8x SATA; 1600MHz FSB; DDR2-1366+

s we've already alluded to in the title, this board has something special about it – twice as much copper as normal boards. As part of the Ultra Durable 3 scheme, the copper layers in this board are twice as thick as the standard in most boards. Apart from making it sturdy enough to snowboard with, does this actually improve performance? GIGABYTE certainly think so, and that's what we're going to find out, right after we take a short detour around this board's layout.

Starting with the CPU socket, there's plenty of room on all sides to install large coolers, and there's a voidal amount of room between here and the memory slots. The northbridge and power regulation are cooled by neat aluminium and blue-anodised plating, and a nickel-coated copper heatpipe joining them. Strangely placed, there is a Realtek chip just underneath this heatpipe, which seems to be powering one of the Ethernet ports.

The memory slots are in a decent location, though you'll have to remove your graphics card to install modules. Power sockets, IDE and Floppy, as well as 8 SATA ports are all in the usual places, though sadly none of them are right-angled. Front panel connectors at the lower extremity of the board are colour-coded for easy installation, and there are USB and Firewire headers also present. The audio header is up near the back panel connectors.

While we're near the back panel, you get eight USB ports, two Ethernet, Firewire in both large and mini flavours, twin PS/2 ports, Optical and Coaxial, and finally 7.1 channel audio sockets. There are only three system fan headers present on the board, and none in

the lower right-hand corner where they come in handy for intake fans. Encrusting the board on every spare piece of real estate are LEDs, which can get rather annoying.

BIOS options are very good, though, with plenty of control over voltages and speeds

BIOS options are very good, though, with plenty of control over voltages and speeds. All these would be for nought, however, if performance wasn't up to scratch. The good thing... it is, and more!

As you probably know, motherboards are made up of layers consisting of silicon, and a copper layer that acts as a ground or power transfer medium, as well as transferring heat, spreading it over a larger surface area. The typical copper layer will be about as thick as your average piece of paper (just like the one you're reading this on), and offers about the same stability as one. However, the layers used here are twice the thickness – this gives greatly increased physical durability. Indeed, the board hardly flexes when bent, and you'd have to be trying rather hard to get it to.

With this beneficial physical property the extra copper also brings with it a desirable electrical one – twice the conductive material means that twice as many electrons can flow through. We postulated before on whether or not this would actually increase performance, and thanks to

postulated before on whether or not this would actually increase performance, and thanks to Issue 93's P45 roundup, we can check this easily – and it does work!

Comparing the wPrime 32M result of this board to the GIGABYTE EP45-DS3R, we see

comparing the whithe 32M result of this board to the GIGABYTE EP45-DS3R, we see a decrease in time taken by 4.431 seconds, an increase of 8.38 per cent performance gain at stock settings! This trend continued with the ASUS P5Q Deluxe, with a decrease of 4.805 seconds, a 9.02 per cent performance increase. These increases are quite astounding for a simple doubling of the thickness – very impressive.

You'll wind up paying about \$50 more for this board over the aforementioned GIGABYTE board, but the performance is definitely here, and the potential for memory and CPU overclocking is greatly increased – something that every enthusiast will love to bits and bytes.

GIGABYTE EP45-UD3P

GIGABLE EP45-ODSP						
E8400	333x9; DDR2-1066 5-5-5-15	378x9; DDR2-1008 5-5-5-15	423x9; DDR2-1015 5-5-5-15			
PiFast	31.12s	27.39s	24.60s			
wPrime 32M – single thread	48.438s	42.665s	38.018s			
wPrime 32M – multi-thread	24.523s (1.96x efficiency)	21.573s (1.98x)	19.359s (1.96x)			
CineBench R10 64-bit – single thread	3664	4166	4672			
CineBench R10 64-bit – multi-thread	7204 (1.97x efficiency)	8025 (1.93x)	9031 (3.93x)			
Everest Read	7343MB/s	9112MB/s	9116MB/s			
Everest Write	7103MB/s	8056MB/s	9016MB/s			
Everest Latency	72.7ns	60.3ns	58.7ns			



Coolermaster Hyper N620

Dual in-line... heatsink?

Price \$TBA Supplier Coolermaster Website www.coolermaster.com

Specifications Tower cooler; six 6mm heatpipes; two 12cm fans w/ blue LEDs

eatsinks. They're essential for every rig, but strangely most people are content with the bundled stock cooler that comes with their CPU. Well, boo to the stock cooler we say! We've got a bigger, better heatsink now.

Weighing in at 847 grams, this heatsink has a copper base that's machined quite well, though the warning label did leave a slight amount of residue. Make sure to clean this off with some isopropyl alcohol before installation to ensure best heat transfer. This is capped with a shaped piece of aluminium that sandwiches six copper heatpipes, making sure that the heat is absorbed

and taken upwards. Fifty-eight aluminium fins mate with these heatpipes as they arch skywards, pushing through the layers and spreading the heat over a large surface area.

Screwed on top of these fins is a top plate, held in by hex screws, that only seems to make it look slightly more interesting, and hide the ends of the heatpipes. It also displays the Cooler Master logo quite proudly, and provides a quartet of mounting holes for the two fans on either side. These fans are 12cm jobbies, and are made of slightly translucent smoked plastic, with blue LEDs embedded. These are controlled via PWM, share the same cable and by extension, the same header. They make (at the exhaust side) 52dBA at idle, and 61.4dBA at load, which is rather loud considering that two fans should be able to spin slower to achieve the same effect.



Cooling performance was okay on our QX6850 at stock, but overclocking would not remain stable, crashing under heavy load. The mounting system for the cooler was also quite fiddly, requiring that you use nuts and bolts through the mounting holes on the mobo to secure it. Overall, this is a decent heatsink, but there's definitely better options out there.

JR



Coolermaster Hyper N620

Coolermaster Hyper Nozo							
Coolermaster Hyper N620 Thermalright Ultra 120 Extreme							
	Load	Idle	Load	Idle			
3GHz, 1.325V	66	38	60	36			
3.66GHz, 1.45V	77 - Crashed	46	70	42			

Corsair Dominator TR3X6G1600C8D

The first triple channel kit for Nehalem hits the Labs!

Price \$585 Supplier Corsair
Website http://www.corsair.com/
Specifications 3x 2GB kit; PC3-12800; DDR3-1600; 8-8-8-24; 1.65v; 240-pin DIMM; Non-ECC Unbuffered DDR3;
Micron ICs; Lifetime warranty

ehalem brings with it whole new levels of support for not only DDR3 memory, but triple channel too!

This means that three sticks, instead of the usual two, can be run together to provide a huge amount of bandwidth. So when Corsair gave us a yell about its 6GB kit, tailored specifically for Nehalem, we knew we had to give it some loving. Stock speeds of this kit are pretty impressive

for the lower voltage they run at (Nehalem's memory controller runs at a default 1.5V, and 1.65V is the max supported by Intel – though this can be pushed higher, just like overclocking). The stock speeds afforded us a very large amount of read and write bandwidth, as well as good latency. These sticks were even able to be run at 7-7-7-21 at 1600MHz without any extra voltage, affording us a little higher bandwidth, and lower latencies.

Bumping them up in frequency, dropping the timings as needed, we pumped 1.72V through the sticks to get them stable. The performance increases in almost every test, only seeing a small decrease in wPrime performance. Keep in mind that this isn't a groundbreaking amount,



but it's still nice to have that headroom available.
Low latencies weren't worth running at all, with
horrible scores, showing that Nehalem really
likes the higher bandwidth to be kept happy.
A great choice for any enthusiast!

Corsair Dominator TR3X6G1600C8D

Corsair Dominator 1 R3A6G16OOC8D							
the the section of th	1600MHz; 8-8-8-24 (1T); 1.65V – Stock	1890MHz; 9-9-9-24 (1T); 1.72V	1333MHz; 6-6-6-8 (1T); 1.72V				
Hexus PiFast	26.13s	25.97s	26.22s				
wPrime 32M 8x	7.251s	7.358s	7.284s				
Everest Read 18451 MB/s		18985MB/s	15726 MB/s				
Everest Write	14141 MB/s	15153 MB/s	12211 MB/s				
Everest Latency	30.9 ns	28.9ns	32.1ns				



ASUS Xonar HDAV 1.3

A mixed bag of a card we cannot help but like.

Price \$289 Supplier ASUS Websitewww.asus.com.au

Specifications DVI-to-HDMI cable; HDMI cable; Stereo RCA to 3.5mm cable; S/PDIF TOSLINK optical adaptor; -H6 Extension Board cable (for connecting HDAV card and extension board)

Sometimes you note a company doing interesting things. Occasionally, a company will actually listen to the user base and make changes based upon what the populous asks for. Rare are such acts, but it appears to be what ASUS has done with its new ASUS Xonar HDAV 1.3 Deluxe.

It's an odd creature. Two parts, an interswitch link and a set of HDMI to DVI conversion 'jumper' cables make this unit look like it belongs in the Smithsonian. It is wrapped in the ASUS customary black metal shielding. Oh, and this card is the second to possess the much cherished OP-Amp reconfiguration/swap out functionality, just like the legendary Auzentech Prelude 7.1.

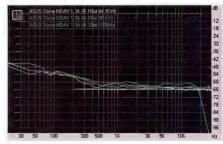
The premise behind the HDAV is as an 'all in one' style device, capable of aggregating your Wii, your PS3, your BD player and every other part of your home entertainment rig into the HTPC. Can it deliver what is essentially a fully featured AV receiver in a double height PCI-E package?

As usual, we tested acoustic measurements with Right Mark's Audio Analyzer. We ran

through our set of 16-bit, 24-bit and 32-bit tests. We employed our choice of medium and high end monitoring for listening tests, in the form of Altec Lansing 641s and Tanoy Reveal 6D Series Studio Reference Monitors. Figure 1 shows a comparison across 16, 24 and 32-bit sampling.

Things look a little wobbly here, unfortunately. The nature of the Noise, Total Harmonic Distortion and Frequency Response could be described as decidedly average. Stereo crosstalk here is also of extreme concern (Figure 3), suggesting the internal IC has some form of signal leakage across poles. How this came to be, we're not sure. For us, the amount of THD present in all sampling rates through the ADC is not excusable.

We sat down to appraise real world performance with our own ears. We waited for the magic and it just didn't come. The whole card seemed to have a slight 'brown' tinge over it. Dark, muddy and sometimes not well enough defined. We suspect this is fairly intentional given the card is highly geared towards the gaming/entertainment market and not at all for the average audiophile. That being said, one could change the characteristics of this card dramatically by simply changing the Op-Amp points.



Stereo crosstalk pattern for ASUS Xonar HDAV 1.3.

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Frequency response with 16bit outlier for ASUS Xonar HDAV 1.3.

Summary data for ASUS Agnar HDAV 1.3.						
(6.	ASUS Xonar HDAV 1.3@16bit 44.1kHz	ASUS Xonar HDAV 1.3@24bit 96kHz	ASUS Xonar HDAV 1.3@32bit 192kHz			
Frequency response (from 40 Hz to 15 kHz), dB:	+0.05, -0.05	+0.23, -0.15	+0.22, -0.15			
Noise level, dB(A):	-66.9	-67.0	-66.9			
Dynamic range, dB (A):	66.9	67.0	67.0			
THD, per cent	0.011	0.015	0.020			
IMD + Noise, per cent:	0.126	0.125	0.123			
Stereo crosstalk, dB:	-64.7	-63.8	-60.9			

But perhaps we're forgetting something. This card is about integration and flexibility. We should look to this as a focus. We took a PS3 and a Pioneer BD player and popped them into the first card's HDMI input. We then sent a loop out of the HDMI output to our Dell 24in HD panels. To our surprise, the HDMI port HDCP communication worked perfectly, first time. Working perfectly, audio and all, out of one set of connections, all streaming entirely through the one HDMI port. In this respect, one might consider the HDAV card a reliable replacement for some home theatre receiver units! The ability to take multiple devices and aggregate them through the card is a definite strenath.

This is a tough one. We're left with a card that doesn't perform that well in terms of pure acoustic ability and doesn't support anything above EAX 2.0, but on the other hand we have an unprecedented level of integration and capability in the form of an 'all in one' solution. We suggest that when considering the purchase, you keep in mind what you want the card for. In a situation where you've got a nice LCD panel for movies, or want your HTPC to be that little bit better integrated with the pure digital path [HDCP in(device > card > device)HDCP out] then we'd say the ASUS Xonar HDAV 1.3 might be right for you.

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	Performance Not the best in sound reproduction, but solid.	
	Features Very well featured!	And the state of t
	Value A complete and well- priced kit.	The Assessment of the Assessme
	Build Excellent. Very sturdy.	To the second se
	Overall It's not perfect, by far, but we like this setup a lot.	
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Verbatim Rapier V1

Perfection in mousing form from an unlikely quarter.

Price \$59 Supplier Verbatim Website www.verbatim.com.au

Specifications Laser gaming mouse; weight bag; mouse bag; Quick Start guide; CD-ROM containing Gamer Toolkit Software and User Guide.

Probatim and gaming. It's a not one of the most common word pairings in the English language, and you'd be forgiven for thinking that any gaming effort by a brand almost better known for making floppy discs would be disastrous. But the truth is that the Rapier V1 mouse might be the best pointer to cross our desk in a long time.

The Rapier's sensitivity can be adjusted on the fly from 800 to 3200 dpi – truly, this mouse is a twitchy gamer's dream, yet just as comfortable with downsizing for smoother sniping performance. A tracking speed of 65ips helps keep things nice and accurate, too.

Speaking of smooth, it features just about the slickest teflon feet we've ever encountered. It's roughed up some now, but out of the box the Rapier practically slides of its own accord over flat surfaces – push it and it keeps on sliding long after it leaves contact with your hand.

It's weight adjustable, too, with five 4.5g weights that sit under the back half of the mouse. With all weights, the mouse weighs a comfy 106g,

Macros are supported in both software and on the mouse directly, plus it's possible to set up mouse and keyboard functionality in tandem. Pair this mouse with a macro enabled keyboard and you'll be in programmable heaven, with seven of the mouse's nine buttons themselves being

programmable.

As an added bonus, once configured, all settings are stored on the mouse. Nor does it require any special drivers. Combined with the handy-dandy travel bag, this is an excellent LANing device, especially if you're not sure of the machine you're going to end up playing on.

But it's one thing that really raises this mouse above the pack, and that's the placement of the scrollwheel. Verbatim has thrown out the traditional center placement; instead, the wheel sits just off center on the left mouse button. This makes scrolling between weapons or zoom levels a far easier activity, and actually increases overall mouse comfort and hand-endurance. Why no one's ever thought of this before is a mystery, but

now we can't live without it.

There's a Verbatim-branded mouse mat to go with the Rapier, but frankly this is a mouse built for almost any surface.



Razer Salmosa

A gaming mouse you don't need a degree to look at.

Price \$67 Supplier Razer
Website www.razerzone.com
Specifications 1800dpi Razer Precision 3G infrared sensor,
On-The-Fly Sensitivity adjustment.

aming mice. Strange creatures. Often extremely complicated and ludicrous in form and function. With the Razer Salmosa, however, we have a more basic gaming pointer. There are no lighting effects, spinning lasers or disco balls attached to this mouse... oh no. The Salmosa is a plain symmetrical three-button solution, and quite a departure from the usual gaming mouse gig. Things such as added weights, on board memory and obviously programmable buttons have gone the way of the dodo. What's left is a well-made and well-balanced mouse for your simple gaming pleasure.

The innards of the mouse contain a 3G Infrared Sensor and on the underside of the mouse we find switches allowing you to make 800/1800dpi and 125/500/1000Hz polling

rate adjustments on the fly. The positioning of these buttons however largely negate the 'on the fly' bit and could have benefited with a position on top of the mouse as found on other mice.

The Salmosa glides smoothly across pretty much any surface you care to use it on thanks to the Teflon feet and is very responsive. It also feels solid in the hand with the backside of the mouse being slightly larger than other Razer mice, so that it rests more comfortably in the palm of your hand. One minor annoyance with the mouse is its annoying loud click; this is less of a problem in game with speakers blazing, but does irk once used out of the gaming environment.

As long as you can do without the extra features of other, more expensive gaming mice, the Salmosa has a great look and feel and performs admirably in and out of games. However we feel that a few extra buttons wouldn't have gone astray and the cost, given the lacking features, is just too high.





Orbita mouse

Odd in shape, but excellent in design.

Price \$98.50 Supplier Cyber-e-sport Website www.cyber-e-sport.com

hen a radical new mouse design crosses our desks, you just know we're nerdy enough to be damn excited. When it claims to be great for gaming - as well as CAD, 3D work and similar apps - you know we're doubly interested.

The Orbita mouse is the latest rodent to come out of the dedicated mousing labs at Cyber Sport. It's a curious little thing, round and white – kind of like the old iMac mice – and when you actually pick it up it's... all soft and pliable.

That's thanks to a flexible rubber sheath (just typing that makes me feel odd), and it rests on smooth teflon feet that are set into a ring that in turn rests on a series of ball bearings. The idea is that you can swivel the mouse in place to scroll through documents, and you can orient the 'up' and 'down' of the mouse on the fly. The mouse is ringed by buttons under the rubber skirt (that sounds wrong too), and has a button

for scrolling on top, and what Cyber Sport calls 'push and squeeze' buttons around the outside.

This mouse is simply a walking innuendo.

What it also is very good at providing an alternative way to mouse around pro applications – like CAD apps or design suites like Adobe In Design – or even more mainstream apps like Google Earth. Cyber E Sport also claims it's great in games, but as we usually find with innovative game designs, the effort to unlearn all your old mousing skills is simply too difficult.

As a alternative in a professional environment where image and virtual space manipulation is the go, getting the hang of this mouse will produce results. But it's not really for the gaming crowd, as much as we applaud this unique design. (PDH



Antec Twelve Hundred

Almost exactly three hundred more than the nine hundred...

Price \$245 Supplier Altech Computers Website www.altech.com.au

Specifications: 213 x 582 x 513mm (W x H x D); 3 x 120mm LED Fan (front); 1 x 200mm LED Fan (top); 2 x 120mm LED Fan (rear); 12 x 5.25in drive bay (external, shared with drive cages); 9 x 3.5in drive bay (internal, taken from 5.25in area); ATX, M-ATX; SECC Steel with windowed panel.

aming cases are a finicky thing – you've got to have the right balance of functionality, airflow and raw dripping tech appeal to get it right. Well, Antec has evolved its Nine Hundred case into something with just that little bit more – the Twelve Hundred.

Named after its increase in 5.25in bays to twelve (over, you guessed it, nine), the case is very large, and has surprising heft – you'll need to be careful with this case once you've installed a system into it. The front facia is made of perforated mesh, complete with dust filters, giving the three 12cm fans plenty of room to suck the most air through the chassis. These are lit blue, and let off an appreciably cool glow when on, one that'll look pretty good in a dark room – just don't expect to sleep near it!

The side panel has a large Pacman-shaped window in it, secured by rivets. There's also a meshed area, where you can add another 12cm fan – this really isn't needed for most people (then again, you're not most people, are you?). Just make sure your cabling job is neat; this window will display all your it'll-do cabling and other messed up areas – and put you to shame.

Up on top of the case is power and reset buttons, two USB, audio and an eSATA port. Unlike the recessed plastic tray of its predecessor, this case has a sloped ramp with a rubberised mat that should stop anything you put there from sliding around; anything you put there, well, stays there. There's an interesting gridwork pattern up here too, but it doesn't really help anything practically. Handling the job of expelling airflow is a massive 200mm fan, joined by a further two 12cm fans at the rear of the case. All of the fans in the case are speedcontrollable (via switches on the back for the rear/top, and dials on the front), and the LEDs can be switched off altogether in the 200mm fan. Also present are two large watercooling holes, pregrommeted to protect the fragile tubing, and the PSU is mounted at the bottom of the case

Moving inside, every surface in there is powder-coated in matte black, which looks very, very good. There's also a lot of room behind the mobo tray for running power supply cables up the back, which is essential for keeping it neat and tidy in there. The three cages that give HDD access and fans can be relocated as you see fit. Out of these, the top cage can have an additional 12cm fan added, giving even more airflow to this already airflow-laden case.

Mounting for the power supply is at the

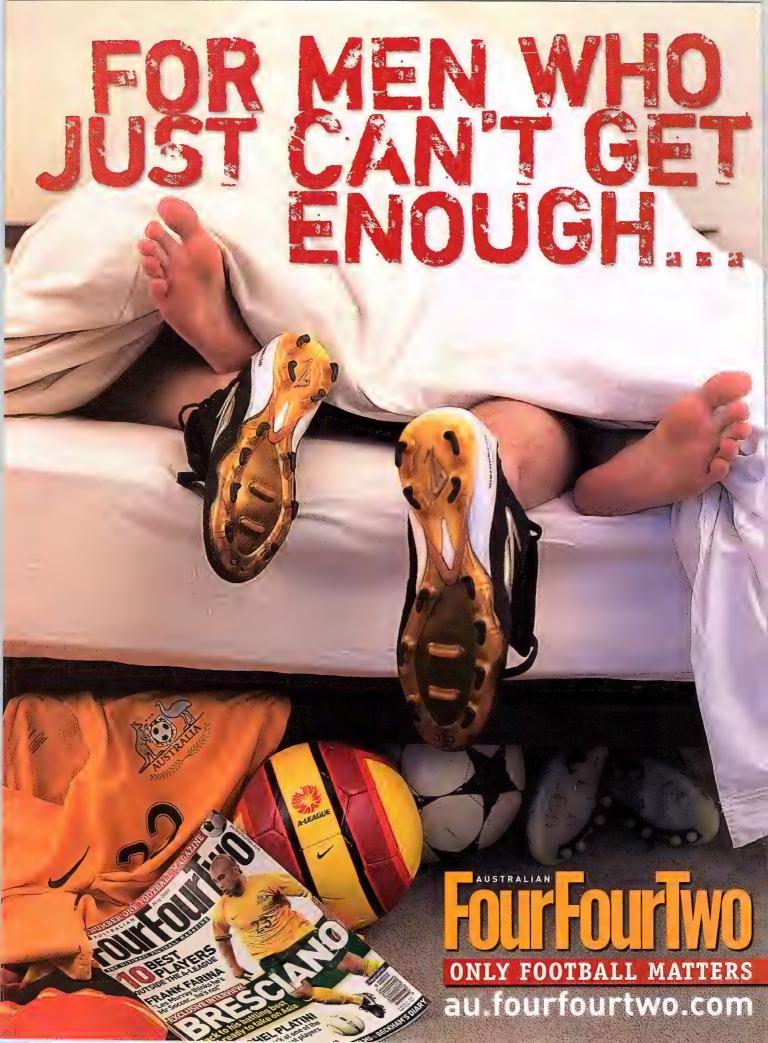
bottom of the case, where it rests on four little rubber pads to minimise vibrations, as well as allowing some airflow in and around the PSU. Some of the more common standoffs are preinstalled by default, but it's very easy to add more to suit your setup. Every part of this case is expertly finished, and the paint job is consistent the whole way through. The only pitfall is that the LEDs do get rather bright – this may well get annoying in a very short period of time.

For gamers with a lot of tech, this really is the perfect case – for everyone else, it's a strong contender for your hard-earned, if you like the looks.









Deus EX OC PC

A very shiny PC that, though pricey, is hard not to like.

Price \$4,179 Supplier Deus Ex Technologies Website www.deus-ex.com.au

Specifications: Intel Core 2 Duo E8600 (overclocked to 4.25GHz); Zalman CPU cooler; GIGABYTE GA-EP45T-DS3R mobo; 4GB Corsair DDR3 @ 1333MHz; HIS ATI HD4870 X2 2GB DDR5; 1x 300GB WD VelociRaptor @ 10,000rpm, 1x 750GB Samsung HDD @ 7,200rpm; Samsung DVD burner; 620w Corsair PSU; Antec P182 case; Windows Vista 64-bit

he specs above tell the tale pretty thoroughly, but we have to say that this is pretty much a near perfect mix of components. In fact, it's very nearly identical – down to the case – to our own Justin Robinson's home rig! Even the choice of hard drives is well thought out, with a faster system drive that also has enough room for games, and a larger storage drive for larger files that don't necessarily need such speedy access. The aftermarket cooler is a lovely copper Zalman sink and fan combo, very popular amongst vendors that sell OCed gear, and the RAM is well considered two sticks of 2GB Corsair DDR3. This means there's space to upgrade, and you still get the immediate benefit of the 64-bit OS.

All that great gear has been lovingly cabled to within an inch of its silicon life. All cable slack has been neatly stored away behind the mobo back plate. In fact, it's so tightly stored there that you

Benchmark results

-enemant results	
Crysis (1280 x 1024, no AA, Very High)	47.02 fps
3DMark Vantage	P12,440
3DMark06	20,145

remove that side-panel at your own risk – it's hard to get back on! The HDD's SATA cables are nice and long, meaning you never put them under strain when sliding the drives out of their bays, too.

As to the custom spray job? Well, that's a matter for personal taste – it's certainly striking, though whether it's worth it to you enough to lay down a shade over \$400 for... well, at least it's one saving you might be able to make. We can say the quality of the job is superb, though, and the mirror finish has to be seen to be believed.

But all the looks in the world won't save a system from our wrath if it can't perform. Thankfully, Deus Ex has that department covered too.

One of the fastest – and most expensive – systems we've looked at recently was the Pioneer DreamVision, in issue 92. It topped 22,000 3Dmarks in the 06 version of the program, and could handle our *Crysis* benching with near disdain. It also cost over \$6,000.

Deus Ex's effort is of course below that stupendous effort, but its 20,149 3DMarks is not far off, and at a significant cost saving. It's faster than ScorpionTech's system from the same issue, too, though that is a complete system (monitor and all) for only a few hundred more. Then again, if you ditch the paint job and the Three Year Onsite warranty of this particular unit, you'd knock about \$600 off the price.

Suddenly, this becomes very competitive.

sive the Finally, there's also the excellent customer

Finally, there's also the excellent customer service to consider. Not only was the case shipped in a secure wooden crate, but in the bundle was a folder of documents for the 'new owner'. This includes a letter with the name of the engineer who built your system, similar details for the airbrushing, full benchmarking results at stock and overclocked specs, plus a guide to reloading the overclocked settings if you should happen to suffer some BIOS disaster. Anyone who bought this machine could not help but feel looked after by the vendor. Even we felt kinda chuffed, and we're just reviewing it!

We think this machine hits the perfect sweet spot of performance to price, of bling to functionality. For the overall package, we can't help but call this the best PC we've seen from a builder this year.







Lian Li PC-K8

Budget and Lian Li do not mix well...

Price \$169 Supplier Anyware Website www.anvware.com.au

Specifications: 1x120mm LED Fan (front); 1x120mm Fan (rear); 4 x 5.25in drive bay (external); 1 x 3.5in drive bay (external); 4 x 3.5in drive bay (internal); ATX, M-ATX; SECC Steel frame, aluminium sidepanels; FSP 450W PSU.

hen most people think of Lian Li giant price tags, exceptional quality, and a love for brushed and anodised aluminium are usually the first things to come to mind. But when you look at this case closely, you'll find a surprising lack of all of the above.

The fascia of this case is made of stamped and rolled aluminium. Typically this is indicative of very high quality, but here it looks quite rough - almost like Lian Li didn't care about whether or not it looked like a Lian Li case at all. The intake vents at the bottom are much too wide and tall to be considered stylish, and are simply relegated to being functional. Not only that, but the 5.25in bay covers have a large gap between them. Sure aluminium is tricky to work with, but can't they at least make sure they fit snugly?

The top of the case is very thin brushed aluminium, and has a very solid power button (though the reset button can be tricky to press for those with bigger hands). Two USB, one Firewire and audio/mic jacks are present underneath a little door. Neither of the two sidepanels have anything on them, and they wobble alarmingly when moved (Hollingworth just did a very convincing wobbleboard impression with one), so make sure you don't leave them anywhere that a weight of any kind can be placed on it. Including a cat, which we're relatively sure would dent it irreparably.

Sadly, this is where the waferthin aluminium ends, and boring steel starts. The inside of the case is constructed exclusively of steel, something that adds a significant amount of weight to what would otherwise be a light case. This is probably a good thing, because if Lian Li kept using aluminium here at that thickness, the case would crumple rather easily.

HDD bays are the traditional Lian Li mounting style, which is great for reducing vibrations - but probably not needed as much in a predominantly steel case. The 5.25in bays are rather boring as well, held in by screws instead of quick-install rails. Oh sure, two higher bays can have drives secured with included plastic clips, but we'd honestly trust them about as much as you should eat something labelled 'hazardous'. Two 12cm fans, one with blue LEDs at the front, move air through the case pretty effectively, though this is a standard design and fails to impress any more - just check another item off the list of a basic case.

This case does come with a power supply,

an unconventional Lian Li inclusion, and it's a

shame that it's so downright horrible. With a claimed 13A and 14A on two 12V rails, we'd trust that rating about as far as we can throw the PSU itself (which due to the disturbing lack of weight in it would be quite far, annoyingly). It does have a 12cm fan in it, which is a small consolation, and will aid airflow somewhat.

This case is aimed at the budget builder, but if you're so vain that you must have Lian Li-style looks, go and buy a real one - not this hybridised Frankenstein. We are not amused. (6) JR









Extreme Power Supply



www.lian-li.com



Optimized for PC Gamer & PC Enthusiasts

PS-A470GB	470W	570max
PS-A650GB	650W	750max
PS-A750GB	750W	850max

* PS-A650GB / PS-A750GB is blue LED fan

3% Stable Voltage Layout Design Double Forward Converter Design Japan Made Main Capacitors

Ultra High Efficiency to 86%

Active Power Factor Correction PCI Express V2.0 Support Easy Swap Connector Silent Fan Control Design 120mm Ball Bearing Cooling Fan Honey Comb Ventilation Design

3% Stable



Double Forward Converter Design



Japan Made Main Capacitors



Ultra High Efficiency



Active Power Factor Correction



PCI Express V2.0



Easy Swap Connector



Silent Fan Control Design



135mm Ball Bearing Cooling Fan

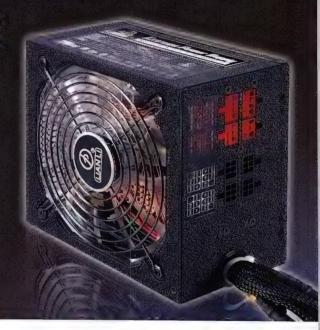
SILENT FORCE **Tuned for Best Silent Performance**

PS-S650GE PS-S750GE PS-S850GE 650W 750W 850W

3% Stable Voltage Layout Design Double Forward Converter Design Japan Made Main Capacitors

Ultra High Efficiency to 83%

Active Power Factor Correction PCI Express V2.0 Support Easy Swap Connector Silent Fan Control Design 135mm Ball Bearing Cooling Fan Honey Comb Ventilation Design Cable management



Connectors



Motherboard



Motherboard 24pin(only 750W)





















20+4pin

PCI-E 6+2pin





PCI-F 6pin

	PS-A470GB	PS-A650GB	PS-A750GB	PS-S650GE	PS-S750GE & PS-S850GE
Motherboard 20+4pin	x 1	x 1	Motherboard 24pin	x 1	x1
+12V 4+4pin POWER	x 1	x 1	+12V 8pin POWER +12V 4pin POWER	x 1	+12V(4+4)pin POWER x 1
Peripheral	x 4	x 7	х7	x 1	x 1
Floppy	x 1	x 1	x 1	x 4	x 6
SATA	x 4	x 6	x 6	x 2	x 2
PCI-E 6+2 pin	x 1	x 2	x 2	x 6	x 6
PCI-E 6 pin				x 1	x2 Finest
PCI-E 6+2 pin				x 1	x 2 Quality

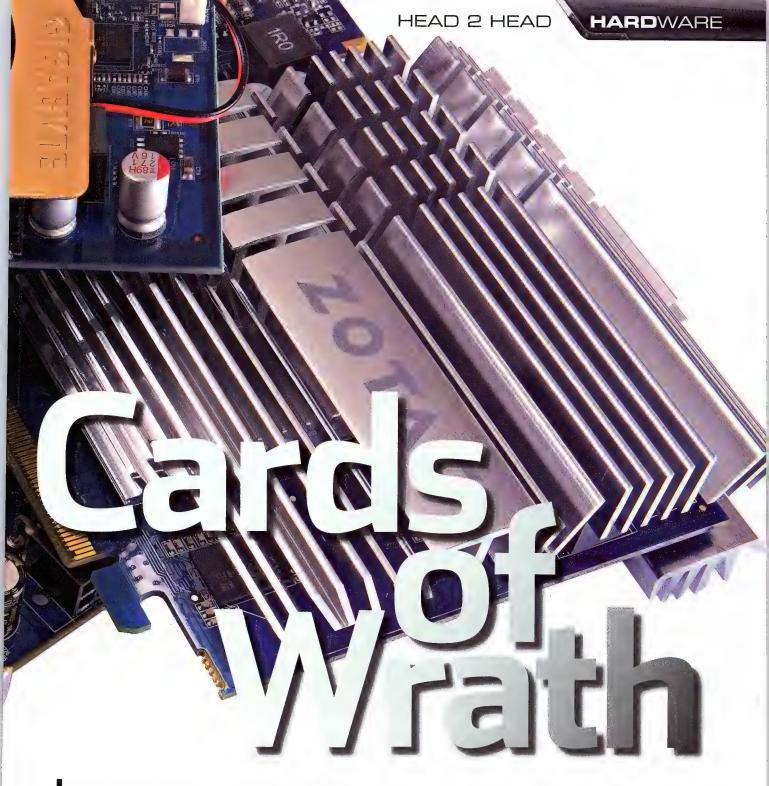
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Made in Taiwan





Eleven cards. Ten pages. **Justin Robinson** compares the current crop of budget cards in the market.

ere at Atomic we're used to the biggest, fastest and best. But sometimes this isn't always practical, nor realistic in the real world, to always be on the bleeding edge. Naturally, and struck with some inspiration, we decided to find the best budget option so that you don't have to.

With cards ranging from the low-end to

mid-high-end, and prices from all walks of life, we have benched cards from ATI and NVIDIA, and evaluated each one. There are so many cards out there on the market, how is a budding enthusiast or wizened guru going to choose the best for their needs? Well, enter Atomic.

First we took the eleven cards and threw them together inside a locked room. We

checked back on them a few weeks later, and discovered who the victor was. Was it an NVIDIA card, or an ATI card? Was it horrendously expensive, or surprisingly affordable? Was there a victor, or did each card manage to finish the others off completely? The answer, as always, lies just over the next few pages.

How We Tested

Graphics cards are a relatively simple affair to test. Each result can be kept comparable to the next as we can use the one test rig - meaning that performance is relative to each other card in this roundup. Many different readings were taken, and any standout features or issues were noted.

The operating system was Microsoft Windows Vista Home Premium 64-bit SP1, with no audio or network drivers installed. Drivers used for NVIDIA cards were Foreceware 180.42, while ATI cards were treated to a beta release of Catalyst 8.11.

Four benchmarks were used with the cards, including the Crysis built-in GPU test, the Company of Heroes built-in test, 3DMark06 and 3DMark Vantage. Both 3DMark programs were run at default settings, while the games were run at 1,280 x 1,024, all settings set to High, with 4x

AA used in CoH only.

Sound measurements were taken with our magical sound probey stick of wonder (otherwise known as a sound-level meter), and temperatures were recorded via the latest version of GPU-Z, 0.28. Where temperatures would not report, our expert fingers felt instead. Just remember that if you're going to attempt to emulate the extremely manly, modest and powerful Atomic staff, do be careful that you don't burn yourself!

All these benchmark tools are readily available to download for free online, and if you've bought the games, they have them enabled and ready to use. Feel free to compare your results to ours, and see where your rig stacks up in the budget world. Just keep in mind any discrepancies in CPU or other factors if you get a different score

The test rig

Gigabyte EP45-UD3P Intel E8400 @ 333x 9 = 3000MHz TeamXtreem DDR2 @ 1066MHz Antec TruePower Quattro 1000W WD Velociraptor 300GB Thermalright Ultra 120 Extreme

to ours with the same card.

Check out our nifty comparison table as well, to, well, compare the different cards. The graphs are also quite handy for those who need to see a visual, or don't have time to read

Now that you know how we went about testing, flip the page to get into it!



Graphics card specifications							
	Sapphire 4550	Sapphire 4650	GIGABYTE 4650	HIS 4670	Sapphire 4830	Zotac 9400GT	
Core Codename	RV710	RV730 PRO	RV730 PRO	RV730 XT	RV770 LE	G96	
Manufacturing Process	55nm	55nm	55nm	55nm	55nm	55nm	
Transistors (Millions)	242	514	514	514	956	314	
Memory Type/Amount	512MB GDDR3	512MB GDDR3	1GB DDR2	512MB GDDR3	512MB GDDR3	512MB DDR2	
Memory Interface	64-bit	128-bit	128-bit	128-bit	256-bit	128-bit	
Stream Processors/Shader Units	80	320	320	320	640	16	
Video Outputs	DVI, VGA	DVI x 2	DVI, VGA, HDMI	DVI x 2	DVI x 2	DVI x 2	
Width	Single	Single	Single	Dual	Dual	Dual	
Price	\$110	\$125	\$125	\$137	\$230	\$111	







Graphics card specifications

	Zotac 9500GT	EVGA 9500GT	Foxconn 9600GT	Elitegroup 8800GT	GIGABYTE9800GT
Core Codename	G96	G96	G94	G92	G92b
Manufacturing Process	55nm	55nm	65nm	65nm	55nm
Transistors (Millions)	314	314	505	754	754
Memory Type/Amount	512MB GDDR3	1GB DDR2	512MB GDDR3	512MB GDDR3	1GB GDDR3
Memory Interface	128-bit	128-bit	256-bit	256-bit	256-bit
Stream Processors/Shader Units	32	32	64	112	112
Video Outputs	DVI x 2	DVI x 2	DVI x 2	DVI x 2	DVI x 2
Width	Dual	Single	Single	Single	Dual
Price	\$115	\$115	\$140	\$175	\$235

GIGABYTE HD4650 1GB

Will twice the memory give this card a much-needed boost?

Price \$125

Specifications 650MHz core; 450MHz memory (900MHz effective); RV730 PRO core; 320 shader units; 1GB DDR2; 128-bit memory interface; single slot PCB with active cooling

PC games require quite a bit of memory at times, and certainly so with all your settings on high, and Anti-Aliasing at full. But to do this requires a lot of grunt behind the memory space – does this card have enough to justify the extra RAM?

Plugged into a bright azure PCB, the RV730 PRO core runs at stock speeds of 650MHz, and is built on the decidedly miniature 55nm manufacturing process. There's a lot of memory here, a whole gigabyte of it in fact – just a shame that it is the very slow DDR2 running at only 450MHz. This means that the bandwidth between

GIGABYTE 4650 3d Mark scores

3DMark06 - 4465

3DMark Vantage - P1920

the memory and the core is very limiting, which as you'll read below, definitely harms the performance. A 128-bit memory interface is acceptable, but twice this is really needed to squeeze the best potential out of the aging RAM.

The cooler on the card is similar to other low-end GIGABYTE offerings, a small black anodized aluminium lump with a fan, and a mock-gold cover over the top. With those elements combined, the cooler does look impressive, though the intricate design can make the rest of the card seem boring in comparison. Outputs are taken care of in the form of VGA, DVI and HDMI – great for those with older monitors, or even TV screens.

Performance is rather underwhelming, and compared to the Sapphire 4650 we can see a





really starves the core. The temperatures don't get especially high, with 40 idle and 48 load, but the noise sits at a constant 75.5dBA – enough to drive you up the walls, through the ceiling, and halfway to Mars. We'd definitely pick something else, but if the price is right and your tranquility doesn't matter, this is a decent card.



Apart from being a song from the mid-nineties,

Apart from being a song from the mid-nineties blue also happens to be the predominant colour of this card – and when you look carefully at the name you'll understand why. Yes, this is a card from Sapphire, dripping with ocean-blue coloured PCB and a very standard cooler.

Indeed, the cooler is so standard that it has suddenly become noteworthy – we really have to mention how boring and barely adequate it is at the task of cooling. A very small amount of

Sapphire 4650 3d Mark scores

3PMark Vantage - **P2981**

aluminium fins underneath that thin plastic sheath with an equally thin fan just barely manage to keep the entire card becoming overheated under load – especially the memory chips. The RV730 PRO core and 512BM of GDDR3 memory are very standard, as are the two DVI ports, analogue video out, and the two Crossfire tabs. We could go on to describe how the PCle 2.0 pins are decidedly functional, or about the mishmash of solid and electrolytic capacitors used, or even how underwhelming the bundle with just the bare essentials such as DVI adapters is, but we wouldn't want to bore you.

Instead, we'll describe the performance – it's rather surprising. Compared to the Gigabyte 4650 with twice the memory, this card actually pulls ahead significantly in every single benchmark. The

Sapphire 4650 Gaming Benchmarks

Avg. 33.93

Max. 39.46

Avg. 26.90

Min 7.40

Sapphire HD4650

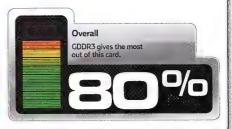
I'm blue da ba dee da ba die...

Price \$125

Specifications 650MHz core; 900MHz memory (1800MHz effective); RV730 PRO core; 320 shader units; 512MB GDDR3; 128-bit memory interface; single slot PCB with active cooling

massive increase in memory bandwidth is to thank here, and it's able to keep the core sated with big meaty chunks of data, rather than just teasing it with entrées and mere morsels (bytes, if you will). With the core kept fed, it's able to perform P1061 better in Vantage, which is a rather phenomenal increase for a simple memory change!

The card is quite decent overall, and the price is definitely something to consider.



HIS 4670 IceQ

Ice, ice baby...

Price \$137

Specifications 780MHz core; 1000MHz memory (2000MHz effective); RV730 XT core; 320 shader units; 512MB GDDR3; 128-bit memory interface; dual slot PCB with active cooling

Sadly, we didn't get to bench this card to Vanilla Ice's popular song from the nineties, but we did get to bench it anyway – read on to find out if this card is hot or not.

Tech specs are relatively solid on this one, with the RV730 XT core running at an overclocked speed of 30MHz over stock (750MHz) and the memory zooming along a 128-bit bus at 1000MHz. Strangely, these memory chips are not covered by any part of the cooler, nor do they receive airflow from the card – make sure you have good case airflow if you're going to push the memory any further.

HIS 4670 IceQ 3d Mark scores

3DMark06 - 7986 3DMark Vantage - **P3445** The cooler itself is the usual HIS IceQ – a solid block of aluminium that rises up into thick, extruded aluminium fins, enclosed by a frosted plastic shroud and a large blue fan. This creates a very effective wind tunnel, sucking in cool air and dumping all the hot air outside the rear of the case. Another interesting feature is that the fan blades are actually UV reactive, but there are no LEDs available to take advantage of this – you'll need to buy some UV CCFLs/LEDs if you want it to glow.

Twin DVI ports and an analogue video out port are standard fare, as are the two Crossfire connectors on the card – though no bridge was included in the packaging; you'll have to buy one elsewhere if you want to use Crossfire with this card. Most ATI cards with the connectors will come with the bridge, so this is a very



ck, ed tes a and case. des os ed to strange omission.

Performance is pretty good for the asking price, returning good scores across the board, and giving you a decent playing experience in both the games. Idle temps are at 37 degrees, and load hits 53 with a constant 52.8dBA generated – this has plenty of room for overclocking, and remains rather quiet throughout.



heatsink rest of the 60dBA The continue the twice the

If you couldn't tell already, this card is a source of amusement around the Labs. The circular cooler, essentially a radial finned aluminium block with fan, has two plastic tabs that are useless if not for making the card look slightly wonky. The good thing about this cooler, however, is that the air is blown through the fins directly at the memory chips, keeping them nice and cool, and also over the small heatsink over the power regulation. While temperature readings refused to behave on the supplied modified CCC 8.10 drivers, the

Sapphire 4830 3d Mark scores

3DMark Vantage – P5598

heatsink became slightly warm under load, but the rest of the card remained pleasantly cool, with only

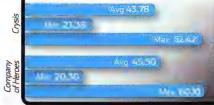
60dBA noise generated.

The core in this card is a strange beastie. It has twice the shader units of the next step down, but only 140 less than the next step up. These run at a very slow 575MHz, but have 512MB of fast GDDR3 at 900MHz on a 256-bit bus – this is

GDDR3 at 900MHz on a 256-bit bus – this is plenty of memory bandwidth and space for the vast majority of gaming needs out there. It is still built on the same 55nm process as the rest of the four series cards.

Two plain-Jane DVI ports and analogue video are present, as well as Crossfire tabs to run two of these in unison to improve performance. Oddly, there are three electrolytic capacitors used on

Sapphire 4830 Gaming Benchmarks



Sapphire 4830

Holy freaking circular objects, Batman!

Price \$23

Specifications 575MHz core; 900MHz memory (1800MHz effective); RV770 LE core; 640 shader units; 512GB GDDR3; 256-bit memory interface; dual slot PCB with active cooling; sixpin power connector

the card – surely it isn't worth adding in the potential risk over spending the slight extra on dependable solid caps?

Performance in games is very good - each was extremely playable, devouring our benchmarks with zealous appetite. You will be very happy with this card for all current games on the market, as long as you're willing to turn a few settings down from time to time.



Gigabyte 9800GT

3DMark Vantage result is not indicative of evil, only performance.

Specifications 600MHz core; 900MHz memory (1800MHz effective); 1500MHz shader; G92b core; 112 stream processors; 1GB GDDR3; 256-bit memory interface; dual-slot PCB with active cooling; one 6-pin PCle power connector

By now we'll assume everyone is on the same page with graphics cards. You plug them in, they make pretty pictures, and everyone is happy. Well with this card you're going to be extremely so.

Fuelling this beastly budget board is the g92b core, a 55nm revision of the very same core in the 8800GT (g92). This means that there's less heat generated, and that more cores can be made on a single wafer of silicon - more cores means cheaper costs overall for us! 1GB of GDDR3 memory with a 256-bit memory bus is also great news, since there's

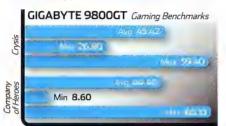
GIGABYTE 9800GT 3d Mark scores

3DMark Vantage - P6666

more than enough space for even the most intensive of games to run very smoothly. Core and memory speeds remain at stock, but expect to be able to push this cool core in excess of 100MHz very easily - especially with the Zalman VF830 aftermarket cooler that GIGABYTE ever so kindly attached.

With an array of 0.3mm aluminium fins and two copper heatpipes, the large fan in the middle is able to effectively blow away all the heat generated by the core, as well as keeping the surrounding memory cool. This idles at 43 degrees, and load is only 55, giving you plenty of headroom to overclock (though the 67dBA produced is a little on the louder side of annoying).

Only solid caps have been used on the card, and surprisingly ferrite chokes were also used



expect this card to last a little longer than those of yesteryear. Performance was the best in our roundup

giving very good benchmark scores, and it is able to handle the latest games at good settings. The usual DVI and analogue video out ports round out a pretty swish card, and one that is definitely worth a good long think.



Foxconn 9600GT

21st Century Fox(conn) proudly presents...

From the first moment that we withdrew this long, hard, black, phallic object from the

colourful packaging, we knew we were in for a fun time. Inserting it into our test rig gently (and reseating it a few times to show we cared), we got down to some stimulating.

Ok, we'll stop with the suggestiveness, but this is still a rather impressive card. The q94 core inside it has 64 stream processors running at a very nice speed (a slight bump over stock clocks) and plenty of GDDR3

Foxconn 9600GT 3d Mark scores

memory to fit in all those game mods that we love so much (sure a 200MB atomic-green sky texture might seem excessive, but it's totally worth it). Manufactured on a 65nm process, this is a very capable card, with two DVI ports and a SLI tab giving potential future upgrade paths with dual monitors and cards respectively.

Described earlier is the sleek black stock cooler. taking up a single slot with a large fan, many aluminium fins and a few copper heatpipes to move the heat around effectively. The drawback of this style of heatsink is that the heat is dumped into the case, but an upside is that it leaves plenty of room for other expansion cards, even when running two of them.

Temperatures are managed pretty well too,

Foxconn 9600GT Gaming Benchmarks Crysis

Specifications 655MHz core: 910MHz memory (1820MHz effective); 1625MHz shader; q94 core; 64 stream processors; 512MB GDDR3; 256-bit memory interface; single slot PCB with active cooling; 6-pin PCle power connector

idling at 48 degrees and hitting 61 at load, with 49.5dBA and 51.1dBA respectively - this was pretty quiet, and definitely ignorable once in a case. Gaming performance is guite nice, and benchmark scores reflected this. Keep in mind that since temps are quite low, you'll be able to overclock this card and squeeze more out of it, something that is easily done and very worthwhile for serious gamers.



Elitegroup 8800GT

The 8800 ain't dead, man!

Price\$175

Specifications 600MHz core; 900MHz memory (1800MHz effective); 1512MHz shader; G92 core; 112 stream processors; 512MB GDDR3; 256-bit memory interface; single-slot PCB with active cooling; one 6-pin PCIe power connector

Elitegroup, or ECS for those who can't find the company under that name, is a relatively interesting outfit, with some rather interesting products. Just check out its 9800GTX+ Hydra pack in Issue 93 to see just how different they can be!

Today though, we're looking at its offering in the form of an 8800GT. While this isn't exactly the razor-sharp cutting-edge any more, it certainly has more than enough grunt to compete with and even outperform many other cards. The g92 core is hard at work here, with a 65nm process and 112 stream

Elitegroup 9800GT 3d Mark scores

3DMark06 - 11347 3DMark Vantage - P6266 processors linking up with a 256-bit memory bus, relying on 512MB of GDDR3 memory to store all the data needed. Clock speeds are the same as what we found on the 9800GT, though the shader clock is higher by 12MHz on this offering. Realistically this doesn't amount to any more performance, though it definitely can't hurt it.

The stock cooler used here is the updated model, and is not the full-length one (similar to the one used on the Foxconn card). Instead, it covers about two thirds of the card, a simple block of copper mating with the core and transferring the heat to a series of aluminium fins. A small squirrel cage fan is used to suck air through the card, and the power regulation components are treated to their own miniature heatsinks to ensure stability



under heavy load.
Idle temps were
54.5 degrees at 52.8dBA,
which increased to 72 degrees and
65.2dBA loaded – the small fan
can't move enough air at slower

speeds.

Performance of such an old card is still impressive, and only a few points short of the 9800GT. Not only that, but Elitegroup has bundled a copy of Rainbow 6: Vegas 2 in as well – outstanding considering it's the only manufacturer in this whole roundup to do so.



Before we get too deep into the specs of this card, have a look at it first. Doesn't exactly scream performance, now does it? With a very cut down RV710 core with only 80 shader units (one tenth that of their most powerful) running at 600MHz, with 512MB of GDDR3 on an extremely limiting 64-bit memory bus at 800MHz, this card is a slight mishmash of both good and bad design choices.

Being a half-height card means that all you



SFF lovers out there can easily fit this card in there, or those media nuts who have smaller cases can fit one in without too much trouble. The cooler is a very small lump of blue anodised aluminium, with a quiet fan in the middle making it only 43.5dBA all the time. When under load however, the whole card will heat up significantly, so make sure you've got some good airflow (temp measuring would not work with the supplied CCC 8.10 used in testing). This is mostly due to the small fan again, that moves an amount of air comparable to a butterfly's fart.

DVI, VGA and analogue video out are present, though frustratingly there is no HDMI – this would have been a perfect choice for this kind of card, and a very silly decision to not include it. There is

Sapphire 4550 Gaming Benchmarks

Avg 13.40

Min 7.86

Max 14.73

Avg 12.2

Min 3.6

Max 25.50

Sapphire 4550

Pint-sized card with a heart of silicon

Price \$110

Specifications 600MHz core; 800MHz memory (1600MHz effective); RV710 core; 80 shader units; 512GB GDDR3; 64-bit memory interface; single slot half-height PCB with active cooling

a DVI > HDMI adapter included in the bundle, but this means that you can only have the one digital display at a time, which can prove quite limiting in a few situations.

Performance, as expected, wasn't great. Both the games were unplayable, and the benchmarks were more like a slideshow than smooth video. The good news is that HD video and older games will run just fine on this card, and really, what else would you buy it for?



BINEFELIFY

Liquid inside. Solid outside











Water Level Indicate Blue LED Backlight









GIGABYTE

Specification

Front I/O

Model no 3D-MERCURY-B Dimension (WxHxD) 205 x 620 x 535 ATX / Micro ATX / E-ATX / CEB Motherboard Color Silver / Black 5.25" x 4, 3.5" x 2+5 (internal) Vent + Transparent Side panel Material

USB x 4, 1394 x 1, Audio x 1 12 cm x 3 (system) / 12 cm x 2 (LCS)

Not just a case, but an integrated Water-cooling Solution



NSW

Aus PC-Market (02) 9646 8000 auspcmarket.com.au

Online Centre P/L (02) 9211 0898 onlinecomputer.com.au **PC Superstore** (07) 3299 3399 pcsuperstore.com.au

Umart Online (07) 3369 3928 umart.com.au

VIC

PC Case Gear (03) 9584 7266 pccasegear.com.au

Scorpion Technology 1300 726 770 scorptec.com.au

WA

Austin Computers (08) 9201 2788 austin.net.au

That Computer Shop (08) 9362 2777 thatcomputershop.com

Getright Computers (08) 8231 0622 getright.com.au

Photech Computers (08) 8349 4334 photech.com.au

TAS **Carbil Computers** (03) 6334 5332 carbil-computers.com.au

Taspro Computers (03) 6424 1911 taspro.com.au

Zotac 9400GT Zone Edition

Select your weapon carefully...

Price\$11

Specifications 550MHz core; 800MHz memory (1600MHz effective); 1375MHz shader; G96 core; 16 stream processors; 512MB DDR2; 128-bit memory interface; dual slot PCB with passive cooling

Apart from resembling some crazy Klingon bladed weapon, this card has quite a few quirky features that you won't see elsewhere. But before we delve into the oddities and eccentricies of this card, let's have a look at what give this card the get up and go, to up get and went (wow... just... wow -ed).

Using a very cut down version of the g96 core on a 55nm fab, with only 16 stream processors, using DDR2 on a 128-bit bus, these specs don't scream performance any more than you'd scream at the sight of a fluffy-wuffy kitten. Being made with such a small process is rather handy though – this

Zotac 9400GT 3d Mark scores

3DMark06 – **3193**3DMark Vantage – **P960** - **Error**

card can be effectively cooled via the passive heatsink that we've lovingly dubbed 'Taj'. Sure, we've sunk to a new level of nerddom here, but this also means that it makes absolutely no extra noise – something very handy for those media buffs out there. Temps hit 65 while idling, and just over 70 when loaded, but with any kind of airflow over the card this will drop down to the forties. Just don't expect to be overclocking this one without airflow – heat it no like.

Another strange quirk of this card is the presence of an SLI tab connector, covered with a piece of tape that says 'SLI Not Support'. The circuit traces are even hooked up, and the 9400GT definitely supports SLI, so this is a very odd design choice.



Performance was understandably low, but HD video playback and

older games will be fine. Vantage had a problem running, an issue with PhysX not playing nicely with the card, but you're not really going to be benching with this one so it's rather immaterial.

This card is a decent choice, but we'd look towards the other Zotac card for true aural bliss.



Zotac 9500GT Zone Edition

Totally not named after the Zone Troopers from C&C3

looking for (though the yellow sticker on the black anodized bracket does help somewhat).

Thankfully Zotac has actually granted us access to the SLI tab, so it's possible to run two of these if you'd like to get some slightly faster silent action – just don't expect a miraculous increase. The cooler is the same as well, and idles at 68 degrees, 72 load without active cooling. With a fan this drops to 40 idle, and 44 load – very nice indeed. If you're feeling particularly adventurous (and have good airflow) you can bump this up nicely, overclocking it to give a little performance boost.

While this is a passively cooled card, the 4-pin PWM header is still present, so it's entirely possible to jerry-rig a cheap PWM fan to this connector, and cable-tie it to the card, so that you can control the

Specifications 550MHz core; 800MHz memory (1600MHz effective); 1375MHz shader; G96 core; 32 stream processors; 512MB GDDR3; 128-bit memory interface; dual slot PCB with passive cooling

fan speed via a program like Rivatuner - you can have your cake, and eat it too!

Gaming performance was a bit choppy, but turn some settings down and you'll find yourself with a very decent experience – with no extra noise! This is a very good choice for a media PC, or even for those silent computing purists who would like to play games every now and then, and it's certainly worth the extra four dollars over the Zotac 9400GT.



Budget cards and passive cooling go together

like macaroni and cheese, gin and tonic, meat

and potatoes - the list goes on. This card is

very similar to the Zotac 9400GT, but with a

Sure, the core is the same q96, but this

memory with a much higher bandwidth, the

difference is so small that you can't really tell the two apart without knowing what you're

has twice the stream processors, has GDDR3

same bus and a practically identical PCB. The

few key (and very useful) changes.





EVGA 9500GT

The performance is worse than it's (giga)byte.

Price\$115 (512MB model)

Specifications 550MHz core; 400MHz memory (800MHz effective); 1375MHz shader; G96 core; 32 stream processors; IGB DDR2; 128-bit memory interface; single slot PCB with active cooling.

Puns are just wonderful things, and we can even call them punderful if you'd prefer. But something that isn't quite as punderiffic is this offering from EVGA, that means well but somehow manages to miss the (3D)mark.

An oldschool green PCB has all the usual components you could expect, including solid caps and some ferrite chokes. You've got twin DVI ports, as well as the analogue video out, and the SLI tab is ready and rearing to be mated with another 9500GT for some salacious SLI action. The core is running at stock speeds, but this (as we'll see slightly

EVGA 9500GT 3d Mark scores

3DMark Vantage - P1592

later) is restricted heavily by the choice to use DDR2. There's a whole gigabyte of it, but sadly memory space isn't needed on a core this diminutive, and the extra bandwidth afforded by GDDR3 could have been used to great effect.

Cooling duties are dutifully handled by the small copper cooler, a slightly deformed rectangular-ish affair with a small green fan, and EVGA sticker over it. This is powered by a two-pin fan cable, so there's no option of controlling the fan's speed – instead it sits at a constant 61.6dBA. Granted, it does keep the temperatures low at 46 degrees idle and 54 load, but we'd have liked to see some measure of noise control used here.

Performance, as mentioned above, is hampered



by the slower DDR2, holding the benchmark and gaming performance scores back

noticeably. Data simply can't be fed into this core fast enough, hurting it badly in all the wrong places. The bundle isn't particularly exciting either, with just the basic cables and adaptors included, and the value seems rather low compared to the Zotac card that manages to supply a passive cooler and GDDR3 for the same or lower price.



Comparison graphs

3d Mark 06 score comparison

Control (1861)

HIS ABTO (1886)

Zotac 9400GT - 3193

Crysis average FPS

Sapphire 4550 - 13.4

Sapphire 4650 - 33.93

Zotac 9400GT - 10.18

EVGA 9500GT - 16.14

3d Mark Vantage score comparison

Company of Heroes average FPS

Sapphire 4550 - 1124

Sapphire 4650 - 2981

GIGABYTE 4650 - 1920

Zotac 9400GT - 960

Zotac 9500GT - 2238

EVGA 9500GT - 1592

Sapphire 4550 - 12.20

6 90

Zotac 9400GT - 9.70

EVGA 9500GT - 14.90

So, which one won?

Who reigns supreme?

If one were studious enough in their observation of the graphs, they'd have noticed something quite interesting about the value of each of these cards. They'd also notice, of course, the performance. But what does this all mean, and how is this going to help you decide which card you're going to buy next? Well, we've made some categories to give you that extra edge when taking the final plunge.





Rumour has it that NVIDIA (in all its wisdom) has decided that the current 9-series cards, themselves based on the 8-series, just weren't confusing enough. Instead, plans for Q1 to rename all these cards seem to be in full swing. The 9300 will become the G100, the 9500 will become the G1120, and the 9600 will become the GT130. There seems to be no rhyme nor reason for this nomenclature update, but if it does happen, and it seems likely that it will, just make sure you're not caught out by the change. Keep an eye on www.atomicmpc.com.au for any updates on this.

Best Performance

WINNER GIGABYTE 9800GT

It goes without saying that in this roundup, there's been one card at the top of the deck throughout the entire time. The Gigabyte 9800GT was able to pull ahead in every single test, giving us the best performance, with a

RUNNERUP Elitegroup 8800GT

very good amount of memory, cooling and overclocking headroom. Not only that, but it looks rather interesting too!

This one isn't the best in terms of value, nor is it the best for your buck, but if you do grab

this card you'll be very happy and secure in the knowledge that you've got the fastest budget card out right now – period.

Bang 'fer 'yer Buck WINNER Foxconn 9600GT

Apart from a Fallout 3-induced momentary lapse of correct Australian journalistic accent, this category will give you the highest amount of 3DMark06 points for each dollar you spend. Essentially, you're going to be getting the best increase in performance for your hard-earned

RUNNERUP Elitegroup 8800GT

 and that's definitely a good thing. Keep in mind that this won't necessarily give you the highest performance, however.

The card of choice in this category is the Foxconn 9600GT. Giving you 73.63 3DMark06 points for every dollar you spend, there

really isn't another card that is as good value, making this one an excellent choice. And not only that, but it's also a decent card for gaming too, and perfect for a LANing rig.

Best Overall Value

WINNER Elitegroup 8800GT

Our last category is Value. This isn't quite the same as getting the best performance, nor is it the same as bang for your buck, but rather the amount of awesome stuff you get for the cash outlaid. We've picked the Elitegroup 8800GT, because you get the second-highest performance and bang for your buck, and you get a very good game included – all for

RUNNERUP Foxconn 9600GT

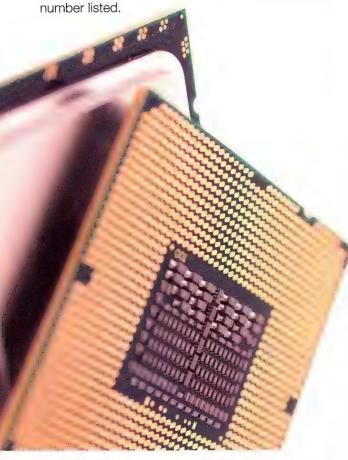
only \$175. You really can't beat this amount of value, and if we were to recommend any of these cards on an overall weighting, this would definitely be the one to pick.

Through all of our benching, testing, calculating, plotting, scheming and dreaming, we've pretty quantitatively shown that the lower end cards are really not worth

considering if you call yourself an enthusiast. Depending on your needs, there's going to be something here for you – and if you want to kick it up a notch in performance, make sure you check out the upcoming issues of Atomic for all the latest and greatest graphics card reviews – there's some exciting cards on the horizon.

KITLOG

here's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and a collection of sports cars (Extreme), we're here to help with this handy matrix of Atomic recommended products. You may find your needs fall between categories - that's okay, just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in Atomic, so if you want to learn more, look up the issue and page





BUDGET



MOTHERBOARD

AMD Phenom X4 9550

A well performing Quad core for those on a budget, that won't break the bank and doesn't get too hot.

BIOSTAR TA790GX A2+

A great overclocker with fast integrated graphics - you don't even need to buy a graphics card with this one! Reviewed in Issue 93 - Page 34



TEAM Xtreem Dark PC2-6400 C4

PRICE \$60

These modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits. Reviewed in Issue 80 - Page 56

GeForce 9800GT 512mb

PRICE \$150-160

A 55nm card that remains very cool and fast, with plenty of headroom for overclocking and a price that speaks volumes about it's value. Great performance too.

Reviewed in Issue 92 - Page 49





Noctua NH-U9B

PRICE \$72

Labs tested to be the top of the cooling game without breaking the bank (or making you sweat - haha) Reviewed in Issue 89 - Page 36

640GB HDD

PRICE \$90

SYSTEMDRIVE

DISPLAY

CASE

The absolute best value for money, with two 320GB platters giving great speed and low latency.





AOC 2216Vw **PRICE \$240**

A great 22" widescreen for any purpose, with accurate colour reproduction and a bloody good price.

Reviewed in Issue 94 - Page ??

Steelsound 5Hv2 **PRICE \$120**

Great gaming headphones with inbuilt mic, but music quality falls short.

Reviewed in Issue 73 - Page 43





Cooler Master CM690 **PRICE \$100**

A sturdy, spacious case with plenty of airflow and more than enough room for the biggest of systems. Some stores even have a windowed version!

Reviewed in Issue 84 - Page 51

PERFORMANCE



Intel Core 2 Duo E8400

A processing powerhouse, now affordable and overclockable like buggery. The Q6600 is the best buy, at about \$240.

GIGABYTE EP45-DS4P

A P45-based mobo with a bevy of features and a good overclocking potential.

Reviewed in Issue 93 - Page 55



TEAM Xtreem Dark PC2-6400 C4 PRICE \$60

Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits. Reviewed in Issue 80 - Page 56



One of the best price to performance cards on the market. Welcome back Red! Reviewed in Issue 92 - Page 36



Thermalright Ultra 120 Extreme

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling. Reviewed in Issue 89 - Page 33



All the speed of dense platters, with the peace of mind to be able to back up your



LG W2252TQ PRICE \$270

You'll pay a little more for this 22" screen, but the colours are amazing, with no backlight bleed and no ghosting. Reviewed in Issue 94



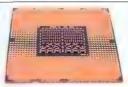
Slightly aged speakers now, but these still offer a great 5.1 sound experience - if you can find a set. Reviewed in Issue 64 - Page 50



Cooler Master HAF 932 **PRICE \$180**

A massive case with three 230mm fans that can move enough air to qualify as a small aeroplane. And quiet to boot. Reviewed in Issue 93 - Page 48

EXTREME



Intel Core i7 i965 PRICE: \$1999

Intel's latest and greatest chip, complete with an unlocked multi, 45nm process, and a massive pricetag. Good for what ails you. Reviewed in Issue 95 - Page 38

GIGABYTE EX58-EXTREME PRICE \$530

GIGABYTE has had the best overclocking board thus far, and therefore the perfect mobo for a beastly rig.

Reviewed in Issue 96 - Page 38



Corsair Dominator TR3X6G1600C8D **PRICE \$585**

Nothing says memory bandwidth like a triple channel kit of speedy, yet imposing RAM - a whole 6GB of it!

Reviewed in Issue 96 - Page 41

ATI 4870X2 2GB x2 PRICE \$650 x2

All the performance of two cards, with the size of one. Makes an ungodly amount of heat, but matches this with unbelievable performance.



Thermalright Ultra 120 Extreme

The current best air cooling - just make sure you grab a LGA1366 mounting kit to use it! Reviewed in Issue 89 - Page 33



The fastest desktop HDD we've seen yet. Grab two and RAID 'em, or mix 'n match with a 640GB for storage capacity and speed. Reviewed in Issue 90 - Page 52





Dell 3008 WFP PRICE \$2199

It's enough to make a grown man weep and beg. Or, at least, that's what we'd do for one of these simply gorgeous displays Reviewed in Issue 88 - Page 59

Logitech Z-5500D **PRIČE \$319**

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike. Reviewed in Issue 48 - Page 56



Lian Li X-2000 **PRICE \$575**

The only case we've had in that has made the editor orgasmically happy, and is drenched with quality in every one of it's brushed aluminium panels. Definitely a case to show off your system-building prowess! Reviewed in Issue 91 - Page 54

Half an ounce of electrons



Dan Rutter crunches only the biggest of numbers.

verybody knows that battery technology is what's standing between us and electric cars, laptops that run for a month, and man-portable death rays.

Everything else has improved immensely, but a lithium-ion battery today only has about ten times as much energy per kilogram as the batteries in a WWI submarine.

We're clearly not very good at this. Ideally, aliens would just land, and hand us some perfect batteries.

The most obvious scientifically-plausible way to make an alien ultra-battery is the Star Trek

Well, to pack the electrons into such a battery, you'd have to do work to push all the tiny negative charges together. Figure out how much work that would be, and you know how much work the electrons will be able to do when you let 'em out again.

The fundamental unit of electrical charge is the 'coulomb'. An electron has a charge of about minus 1.6 (because electrons are negatively charged) times ten to the power of negative nineteen coulombs.

Which is very little.

But an electron is also very, very light.11.5

As it turns out, we're talking joule counts of around ten to the power of thirty, if not more. Given a world power consumption of fifteen to twenty terawatt-hours per year, you're talking a AAA battery that can supply that load for tens of thousands, if not hundreds of thousands, of years.

Any attempt to actually make such a device would, of course, require magnetic containment energies that'd be a serious challenge for entities that make funny-shaped black holes for a hobby. If containment should fail, something rather dramatic would occur...

So if a little green man gives you a choice of a small matter-annihilation power source, or one that contains several grams of electrons, you're a mug if you don't pick the second one.

Just don't drop it.

... you're talking a AAA battery that can supply that load for tens of thousands, if not hundreds of thousands, of years.

one – matter/antimatter annihilation, or some other way of converting mass directly to energy.

What 'E equals MC squared' means is that energy in joules equals mass in kilograms times the speed of light in metres per second, squared. So a mass-conversion 'battery' that weighs as much as a AAA alkaline (11.5 grams), and which converts all of its mass to energy, will yield about 1.034 times ten to the power of fifteen joules of energy.

A joule is a watt-second; if you run a 100-watt light bulb for ten seconds, it consumes 1,000 joules. So if all you need from the above 11.5-gram mass-conversion device is a piddling thousand megawatts of power – the output of a decent nuclear power plant – then it'll be able to deliver it for about twelve days.

Mass conversion spits out a sleet of hard radiation, though, not electricity. Why not just make a 'battery' that's nothing but a container full of electrons?

How much electricity could you, in fact, get from a AAA-sized alien battery containing 11.5 grams of electrons?

grams of electrons would actually give you about 1.26 times ten to the 28 of 'em. Which would have a negative charge of slightly more than two billion coulombs.

That's a lot.

Let's model the job of packing the charges into the battery as taking two charges, each of zero size and about negative one billion coulombs, and pushing those together until they are, let's say, two centimetres apart.

Coulomb's Law tells us the force between two point charges. It's proportional to the product of the charges, and inversely proportional to the square of the distance between them.

If I tell you this, and also tell you that the force needed to push one-billion-Coulomb charges together is more than 300 million Newtons – equivalent to bench-pressing more than 30,600 tonnes – even if one of the charges is on the surface of the earth and the other is located on the moon, you may start to realise that it's possible that the AAA-full-of-electrons may be a little more potent than the self-annihilating AAA.

Don't drop Dan, either! Well, maybe an email...

dan@atomicmpc.com.au





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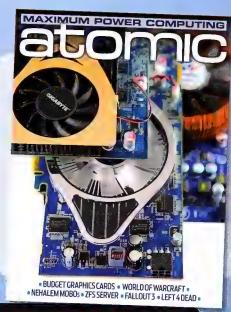
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ORIAL

HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED

As each year passes, we – the techno-literate – find ourselves massing more and more data. Amongst the bits and bytes that make up the datastore that is our modern life, music and movies play an awful big part. But how best to store this, and then access it how we want?

This month we've got two takes on the issue.

We bring it end Stephen Reeves epic treatise on setting up and personalising Windows Home Server. WHS is quite possibly one of the more useful MS products, and certainly one of the more open and accessible, and that's what Stephen looks at this month.

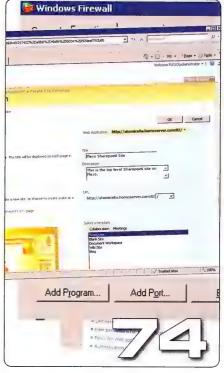
And as one project ends, we start up another with Atomic's brainiest man, Jake Carrol. This time he's got a nefarious plan to build a monster media server using all his corporate big-box skills and know-how!

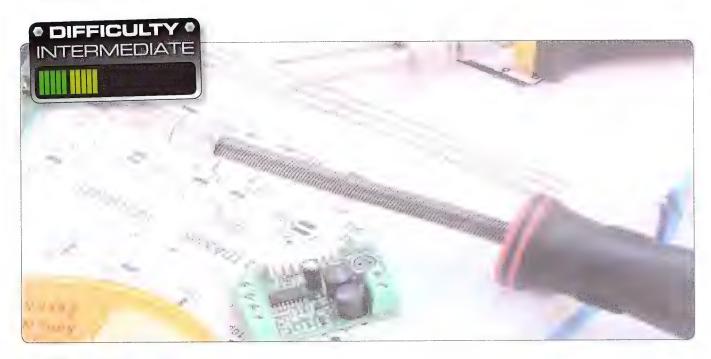
Then we've got our usual dose of educational wisdom from Chris Taylor, and then a tale of tabs from a geek reporter Zara Baxter.





O HARDCORE CONTENTS The ZFS Box 70 Jake Carroll cackles manically and outlines his plans for media domination. Windows Home Server, 74 part the last Stephen Reeves puts the finishing touches on the ultimate data store. Atomic.edu 78 Chris Taylor wants you to learn stuff. Geec Chic 81 Zara Baxter likes safewords.





ZFS Project

Jake Carrol, braniest man alive, starts an evil new project.

t was a slow afternoon. We sat there, wondering about the 'next big thing' in computing. Concern was mounting that Morris was going to be found adorned in maracas and a sombrero shortly, south of the border, or worse, destroying hotel rooms dressed as a rock star impersonator. Brains was complaining about the lack of space, redundancy and organisation of his fileserver at home. His roommate, a man of numbers and logistics to rival no other, simply didn't understand volume management – and it was getting him down. He put his head in his hands and said:

"Right, crazy idea. Time to go to the local Kwik-E-Mart-esque computer parts retailer".

The ZFS fileserver project was born.

Over the coming months, Atomic's loving green hand will take you on a technology tour, showing you how to construct a high performance, ultra high redundancy home NAS environment, on the cheap. Part 1 consists of the technology behind the system, the how and the why. In Part 2 we'll be going through the build phase, components, design and put-together. We'll then show you how to tweak, tune and pimp the file system (yes, you can pimp file systems these days). We want this to be the starting point of something great, for the Atomic storage community.

Storage consolidation

One of the worst feelings in the world is knowing you have data, but not knowing where it is. Worse

than this, is having data that is both important and or unavailable because of damage to the filesystem, files or the integrity of the storage mechanisms. Even worse than this, knowing you have the data, but not knowing that 'bit rot' could be taking place across your array at any given time, let alone your data falling prey to RAID write

- · The ability to snapshot volumes on the fly
- · Flexibility of volume management
- · On the fly bzip2 compression
- SHA1 + MD5 sum/checksum generation
 Complete hardware independence
- · Copy on write functionality (CoW)
- · Enterprise class redundancy options at home

The biggest drawcard of ZFS is the ability for a file system to be constantly monitoring write operations...

holes. The project aims to change the way we look at consolidating storage in the household, as well as adding a layer of far more robust redundancy.

File system starting with 'Z'

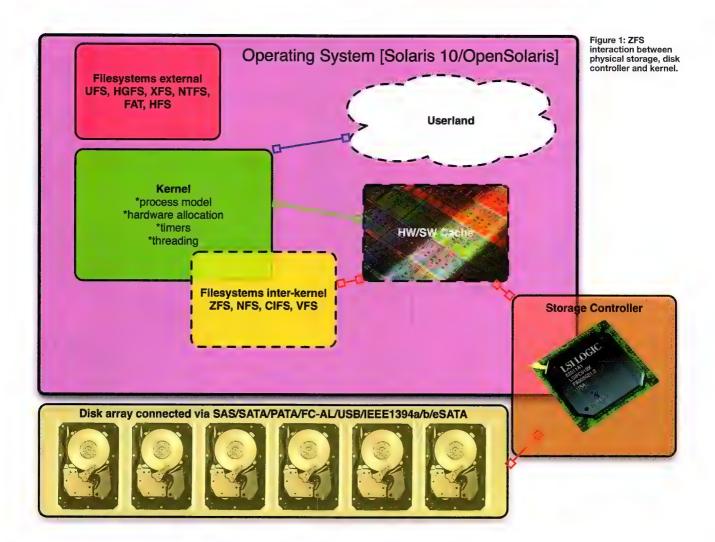
We wanted to see just how much performance we could exert from a file system consisting of 6 * 1TB standard desktop spindles, without going to the point of using a dedicated RAID card and dedicated cache. We didn't want to wind up in a situation where the hardware to run a RAID array cost the same amount, if not more than the summation of the rest of the hardware in the system.

ZFS is a kernel level file system for Solaris 10/OpenSolaris, BSD and Mac OS X 10.5. Some of the primary features and capabilities:

- Performance beyond any normal RAID
- · On the fly block level de-duplication
- Variable DAU for optimal write/read performance Block level file system encryption
- Adaptive Endianness

Figure 1.0 shows the logical isolation of user land processes, 'normal' file systems and inter-kernel file systems and the difference between how they operate with regards to paging efficiency and direct memory access. The biggest drawcard of ZFS is the ability for a file system to be constantly monitoring write operations, as well as micro managing performance on the fly, in a similar way to dedicated expensive controller cards, without any of the associated costs of physical overheads or hardware tie-in. This is Open Storage. More importantly, we see the red arrow connectors, indicating that the path between physical disk, intelligent cache (See Cache Colouring, Issue 93, Atomicmpc, October





2008, 'Big Iron Secrets') and kernel, all in one heterogeneous mass. More common file systems remain disjoint from this interaction, thus, they are not run as efficiently, nor can they achieve some of the functionality that next generation file systems such as ZFS can.

This boils down to us having:

- 1. Faster seek/IO times.
- 2. Higher input/output per second rates (IOPS).
- 3. Lower overheads in physical reads/writes.
- 4. The ability to manipulate data on the fly through kernel, rather than leaving the guessing work to a storage controller. We dive straight through it and mangle things how we see fit!
- Less likelihood of any corruption. In reality, an SHA1 sum on a 128bit files system gives a likelihood of a miss-write, assuming SHA-128 of 1 in 128*64.

We have set an example down for why we have chosen to use ZFS and a comparatively unfriendly UNIX distribution that belongs in a data centre. We'll give you a reason not to use a similar technology, such as LVM (Linux Volume Manager). As much as we love LVM, when we weighed it

up, we realised LVM had two practical flaws that scared us off, in face of a newer technology:

- LVM does not in any way guarantee your volume will be free of bit-rot. You can't SHA1 sum on the fly with this technology.
- 2. There are no write barriers associated with LVM. Ergo, any protection you might have expected against data corruption that comes intrinsic when a system crashes, which journaling would normally deal with, is not applicable here. Crash an LVM mirror on a write on *just* the right spot across a disk barrier, and you'll corrupt a volume descriptor and need an offline rebuild, let alone suffer data loss.

Understanding a ZFS or RAID-Z write/read cycle is critical to the understanding of how the entire system will function as a whole. Figure 2 shows the process of a write cycle and the interacting components in a ZFS based NAS/SAN environment.

From the beginning, a ZFS I/O request is a bit different. When a call from user land is made to request or send block data to physical storage devices, before anything else happens, the block and allocation request are parsed through an SHA1 256bit sum. A sum is generated at this

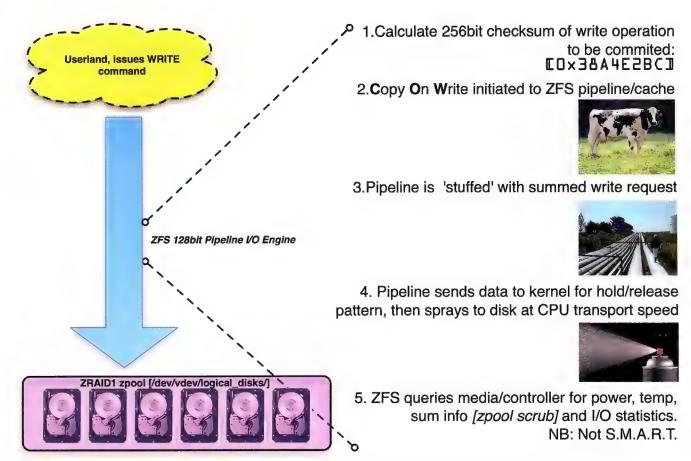
point for the life of the operation.

Next, a Copy on Write request is initiated. CoW is new to filesystems, starting in ZFS. CoW can best be described as a way of optimising memory usage and page timing. In theory, it means that many different processes, with many different threads of I/O could all be talking to the same shared resource. The catch however, is that until one of the threads actually decides to make a modification of the 'copy' it has instantiated, a real or unobscured private copy isn't made. I.e – a 'real' copy is made only when a thread calls out to make a commit request of some kind.

In ZFS, all block pointers within the file system namespace contain a 256bit checksum, as discussed earlier. This is a sum of any given target block. Blocks containing data are never overwritten in place, rather – new block space is allocated, then every instance of modified data is written to it and metadata blocks are allocated alongside to reference it. As you might expect, this is a highly multithreaded processes, designed to scale to 2, 4, 8 or 100's of CPU's. Hence, we say hardware RAID is dead, long live the CPU cycle!

ZFS is hiding something even more sinister however, but to understand it, we need to have a





ZFS I/O pipeline, showing the crucial steps that make the file system so different in direct comparison to conventional file systems.

conversation about current disk technologies.

The spindle speed struggle

Traditionally, to achieve performance in terms of high IOPS and array throughput on disk, we do a few things:

- We buy high speed, high cache size enterprise hard disks that generally consist of 15k RPM FC-AL or SAS platters.
- We 'short stroke' our arrays, by buying huge numbers of disks, then we allocate only the outside of the disk spindles to 'usable' area for higher rotational spindle speed and lower latency.
- We push huge amounts of proprietary DRAM cache in front of our disks in the form of hardware such as Hitachi's HDS V9990 or EMC's DMX series arrays.
- 4. We buy RAID controllers with large amounts of cache internal to IC.

So, there is a problem with all of this. Namely, it is inefficient in terms of cost, power, cooling and ultimately, for very little gain in terms of IOPS. The best example of this minimal gain could be shown in the form of the difference between a 7.2k RPM SATA disk and a 15k RPM FC-AL disk. The gain from the FC-AL drive can be as little as 300 IOPS, at best.

So, there might be a better way. It turns out that ZFS has the ability to tier storage through DRAM, then down to SSD, then to standard spinning SATA or SAS, autonomously. The ZFS engineers have worked out a way to create 'hybrid' storage pools, such that when a user writes files to a disk, they are actually writing to kernel through DRAM, then to ridiculously fast

Next issue, you'll learn how to do things with it that no mortal should.

Next issue, we'll be starting the build and configuration process. If you want to play along at home, you will need:

- A motherboard with as many SATA ports onboard as possible (6 to 8, even 10!)
- A multi-core CPU of recent ilk

The ZFS engineers have worked out a way to create 'hybrid' storage pools, such that when a user writes files to a disk, they are actually writing to the kernel

write optimised MLC SSD's. At 40 times the IOPS of a 15k RPM FC-AL disk, with the same capacity and no moving parts, it starts to change the game. Figure 3 illustrates this technology.

Utilising tiered storage, we can pass through IOPS to devices that are far more capable of handing extreme load, compared with a rotational based physical disk. Using ZFS's inbuilt Adaptive Replacement Cache (ARC), we can autonomously tell the writes to hit DRAM first, then SSD, then slow disk later. It solves the IOPS problems, solves the power/cooling problems – and ultimately, performs far higher than a 15k RPM FC-AL disk ever could! Got an SSD handy?

- 2GB of RAM, minimum
- As many hard disks of equal geometry that one can fathom (6 * 1TB disks are ideal)
- A PSU capable of dealing with a lot of hard disk modules
- A standard PCI-E graphics card. This need not be a high end GPU
- A case, to fit many drive modules in
- A DVD drive/BD drive to install media from
- A copy of Solaris 10, Open Solaris Community Express Edition http://opensolaris.org/ os/downloads/ or the new Open Solaris 2008.5/2008.11 builds

...and sense of innovation and adventure. (F) JC







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Installing Windows SharePoint Services 3

The last part of our epic guide to the perfect WHS setup.

indows SharePoint Services 3, or Share-Point 3, is a free package from Microsoft for Server 2003. It's useful for creating collaborative workspaces, documents, lists, and calendars, for sharing with other users. Because Windows Home Server is basically Windows Server 2003, you can install SharePoint on it. There's a few things you need to do first, such as installing .NET Framework v3. There are more detailed guides available online, I'm just going to run through the steps required to install SharePoint to a point where you can customise it further. A big thank you to the Home Server Blogger, Tom Ziegmann of http://homeserverblogger.com/ for his fantastic tutorial.

It's probably a good idea to try this first on a test server, as you don't want to jeopardise your live data (and, by data we mean porn). When you install to your main server, it might be preferable to obtain the instructions to install SharePoint to the D: drive, as it will retain your database if you need to do a server reinstall.

Download Windows SharePoint Services 3.0 (104 MB)

http://www.microsoft.com/downloads/details.aspx?familyid=EF93E453-75F1-45DF-8C6F-4565E8549C2A&displaylang=en

Download Microsoft .NET Framework 3.0 (2.8 MR)

http://www.microsoft.com/downloads/details.aspx?familyid=10CC340B-F857-4A14-83F5-25634C3BF043&displaylang=en

- Create a folder in the Software share (//SERV-ER/Software) called 'SharePoint 3' or similar, and copy the downloaded files into that folder.
- 2. Open a remote desktop session to your server by going to Start, Run, and type in MSTSC.EXE
- 3. A box will pop up asking for a server name;

open up giving you a warning that using certain administration tools could break your Windows Home Server. Simply close or minimise this

- 6. Open up My Computer and go to C: drive, and create a folder called WSS3.
- 7. Copy the files from the SharePoint folder you created earlier in the Software shared folder.

Installing .NET Framework 3.0

1. First of all, run the dotnetfx3setup.exe application.

It's probably a good idea to try this first on a test server, as you don't want to jeopardise your live data (and by data, we mean porn).

type in the name of your Windows Home Server, which is SERVER by default, unless you've changed it.

- Log on as Administrator and use the password you set when you installed your server (also called the Windows Home Server password or the password you use to access the Console).
- 5. You will then see an Internet Explorer window
- After accepting the EULA, the program will install automatically.
- 3. Click Finish when it's complete.

Installing Windows SharePoint Services 3.0

- 1. Now run the SharePoint.exe application.
- 2. After accepting the EULA, Click the button for the Basic install.



Sharepoint 3.0 Central Administration.

 The installer will install SharePoint, when it's finished, make sure the box is ticked to 'Run the Sharepoint Products and Technologies Wizard now', then click Close.

Completing The Sharepoint Products and Technologies Wizard

- 1. When the wizard opens, click Next.
- 2. You will see a warning about Starting or restarting services, click Yes to continue.
- The installation will continue. Click Finish when completed.

Until we finish setting up SharePoint, the default Remote Access website will be inaccessible.

Setting Up Your SharePoint Site:



Application Management.

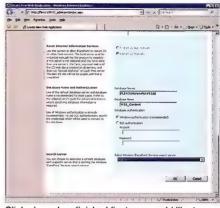
- 1. We need to access the Sharepoint 3.0 Central Administration.
- 2. Go to Start, All Programs, Administrative Tools, Sharepoint 3.0 Central Administration.
- 3. Use the Administrator username and password when prompted.

Deleting The Default Site:

- 1. Click the Application Management tab and select Delete Web Application.
- 2. Make sure Yes is selected for each of 'Delete content databases' and 'Delete IIS Web sites'.
- Click Delete, and then OK. Sharepoint will now delete the default site.
- You will be returned to the Application Management page.



Create New Web Application.



Click okay when finished (just once we'd like to see a 'not okay' option).

Setting Up The New Site:

Now we want to create a new site, click on Create or Extend Web Application. Select Create a New Web Application. Make sure 'Create a new IIS web site' is selected, then fill in the following fields:

- Description: Give your web application a description.
 - I have simply used the server's name and the port number, i.e. 'SERVER 82'.
 - Port Number: Give your web application a port number (that your browser connects to, and IIS will listen for).

You cannot use Port 80, 443 or 4125, as they're used by Windows Home Server, I have used Port 82, though you could use port 81, 82, 8080, 8081 or just about any port over 1024. (You can use Port 80, but it's tricky and not advisable, as it breaks your default website)

- Host Header: The Host Header is your external website URL, eg. domain.homeserver.com.
- Path: Leave as is.
- Skip to Load Balanced URL and make sure it contains the URL to your website including the port number. Eg. http://domain.homeserver. com:82/
- Skip to the Application Pool section and select 'Create new application pool'.
 - You can change the name, or leave it as the default.
 - Select a Predefined security account for the application pool and set it to Network Service.
- Search Server: Pick your server name from the list (it should be the only entry)

Click OK and the new web application will be created. Keep the Application Created window open while you do the next step.

Restart IIS

 At this point you will need to restart the IIS Service, go to Start, Run and type the following: iisreset /noforce



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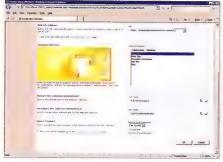








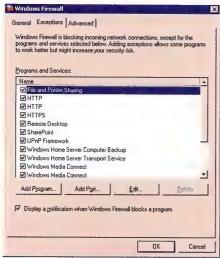
Create Site Collection.



Click OK to Complete.

Create Site Collection

- On the Application Created page, click Create Site Collection.
- We are now going to create the top-level site.
- Give your site a title and a description (if required)
 - 1.Leave the URL box as is.
 - 2. Select a template for your site, either a collaboration or meeting workspace. The Team Site template is selected by default, and would suit most purposes. You can add additional sites later.
 - 3. In the Primary Site Collection Administrator box, type your username in the form SERV-ERNAME/username, eg SERVER/smadge1 4. In the Secondary Site Collection Administrator box, enter the administrator account in the form SERVERNAME/administrator, eg



Windows Firewall Settings.

SERVER/administrator

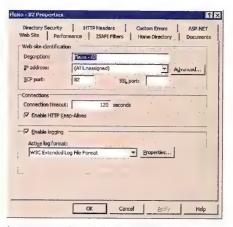
 Click OK to finish. You will be taken to a screen once your site is completed, and you will be given the URL to your new site.

Firewall Settings:

- You will need to allow access through the firewall for your site to be accessible from the network.
 - 1. Click on Start, Control Panel, Windows Firewall.
 - 2. Select the Exceptions tab.
 - 3. Click Add Port
 - 4. Give the Port a name (such as SharePoint)
 - 5. Type your selected port number (eg 82)
 - 6. Make sure TCP is selected.
- Click OK and then OK again to close the Windows Firewall box.

Setting Alternative Access Mappings

- Alternative Access Mappings are required to access your website outside of your home network.
 - 1. Open the Sharepoint 3.0 Central Administration again.
 - 2. Go to Start, All Programs, Administrative Tools, Sharepoint 3.0 Central Administration.
 - 3. Click the Operations tab and then under



inetmgr control panel. Just rolls off the tongue.

external URL (http://yourdomain.homeserver.com:port/).

Internet Explorer will pass your login credentials to the site, other browsers may ask for authentication before displaying your site, especially outside of your home network.

Your SharePoint 3 site is now up and running; you can change the site settings by clicking on Site Actions and selecting Site Settings.

... there is a thriving community of Windows Home Server Server and Media Centre users, all tinkering away customising their boxes...

the Global Configuration section, select Alternate access mappings.

4. Click on Edit Public URLs and on the next screen make sure your site is selected.

5. Change the Default URL to http://servername:port/ (eg. http://SERVER:82/)

 Set the Internet URL to http://yourdomain. homeserver.com:port/ (eg. http://domain. homeserver.com:82/)

Re-enabling The Default Remote Access Website.

- Now you can re-enable the default Remote Access Website.
- 2. Click Start, Run and type in "inetmgr".
- Expand the Web Sites folder and right click on Default Web Site and select Start.

To enable your SharePoint site to be accessed from the internal network, open "inetmgr" again, expand the Web Sites folder, Right click on your new site and choose Properties.

- 1. On the Web Site tab, select Advanced.
- 2. Click Add
- Type in the selected port number and your servername.
- 4. Click OK three times.

Testing

Go back to your desktop PC and open a web browser, test both URLs for your website, the internal URL (http://servername:port/) and your

Conclusion

There are dozens of ways you can adapt your Windows Home Server to suit you, your family and your network. If you'd like to find more ways of extending your Windows Home Server, log onto We Got Served, The Windows Home Server Site, http://www.wegotserved.co.uk/ where there is a thriving community of Windows Home Server and Windows Media Centre users, all tinkering away customising their boxes to suit themselves. Most of the add-in developers frequent the site too, so you can offer suggestions and feedback on what you'd like to see.

If you wish to create your own extensions and add-ins, we encourage you to download the Windows Home Server Software Development Kit (SDK) and start tinkering yourself. (SDK)



Go your own way

Chris Taylor has some advice for those wanting to hit the games industry.

very time we've spoken about how one goes about getting employment in the games development industry, we've mentioned that experience, initiative and a demonstrated ability to not only be creative – any old silly sausage can come up with an idea for a game – but to realise one's creative thoughts are just as important, if not more important, as a qualification. To be sure, almost all institutes that offer games development courses have a couple of group projects that see students develop a working game, but such projects are mandatory. Having worked on something in your own time simply because you wanted to is one of the best demonstrations of enthusiasm there is.

Developing a work of entertainment, though – whether it's a standalone game or a modification for an existing, commercial title – is difficult. That's why, when we've discussed this issue in the past, we've emphasised how important it is to keep your project simple. There's no point drafting a design document for an epic adventure game if you're not capable of developing such a thing. Developers don't expect you to have developed a Crysis-style first person shooter on your weekends while you were studying at QANTM.

If you're already at TAFE or university, some great resources for helping you teach yourself the mechanics of games development can be found

in the campus library. Thomson Learning (www.thomsonlearning.co.uk) has published a series of books covering everything from game design fundamentals to artificial intelligence. There are plenty of brilliant books available. Even if your library doesn't stock a particular title you've heard about, there is an inter-library loan system, allowing students of Monash University, say, to access the catalogue of RMIT University.

One of the best places to find information is, naturally, the internet. But where to go? The internet makes every person a publisher, but the problem with that is 99 per cent of folks don't publish anything of worth. A lot of websites purporting to be helpful are crap. Here are some websites that aren't crap.



www.garagegames.com

There's no way we could've excluded Garage Games from this line-up. Garage Games is not only where you to go acquire the Torque Engine, popular with amateur developers for its affordability and accessibility, but to socialise with like-minded geeks. There are forum sections dedicated to the discussion of, among other topics. DirectX, developing for Linux, sound effects, animation and hardware issues. There's a



Counter Strike was a mod, but is now much more.

'marketplace' in which skilled individuals can seek out existing projects that require extra hands and recruit help for their own projects. A considerable chunk of the forum is focused on the Torque Engine, of course. Handy if you're considering using it for a standalone game. Garage Games also features an extensive catalogue of tutorials that have been penned by community members. The community rates tutorials out of five, so it's easy to see without evening opening a particular tutorial if it's going to be worth your time.

3D Buzz

www.3dbuzz.com

3D Buzz is another site we just had to include. It's been around for years and has always been held in high esteem. Some may remember that the collector's edition of Unreal Tournament 2004 came complete with a number of 3D Buzz's video training modules - Epic's way of encouraging the game's fan base to develop massive amounts of custom content. 3D Buzz's videos cover a wide variety of topics, from UnrealEd to 3ds Max, Delphi to Photoshop. They also produce boxed sets of videos relating to specific topics - XNA, for instance - that you can order and have shipped to you. The box sets aren't cheap, but again, 3D Buzz is known for the quality of their work. The site features a considerable number of free samples, so you'll have a good idea of what you're getting before you punch in your credit card number.



This is an article. A single, short but very good article that is essential reading for anyone looking at designing and developing their own game. It's old, too – you'll have a serious nostalgia trip as author CE Forman talks about the Zork series and



acquiring text-based adventure games by FTP. The article sort of assumes you're developing a text-based adventure, even, but most of Forman's ten points are still relevant to the developers of the next big first person shooter.

XNA official site

creators.xna.com

If you're using XNA, Microsoft's XNA website is a logical place to start. The forum is host to a very active and enthusiastic community, and provides the opportunity to discuss technical XNA and DirectX matters, as well as more general game design issues. There's also a similar sub-forum to the one on Garage Games that allows individuals to find and offer help. Furthermore, the XNA website has an education section that makes available a large collection of samples that demonstrate everything from waypoint navigation to distortion.



Nabacular Drop, an indy title, spawned the popular Portal

... many of their articles are quite complex and targeted at professional developers ...

XNA Development

www.xnadevelopment.com

Still on the topic of XNA, there's this website. It's nowhere near as extensive as the official site, as all the tutorials are produced by one guy, but it's still very good. The guy writes about himself in third person, though. Which is more than a little creepy...

ZiggyWare www.ziggyware.com

Microsoft's XNA sure has spawned a lot of com-

munity websites. ZiggyWare is another good one, featuring a lively forum and videos. At the time of writing, there were some 164 XNA tutorials available at ZiggyWare, as well as a few dealing with general game development issues and C++.

Gamasutra

www.gamasutra.com

Another classic website. Gamasutra isn't so much about tutorials - many of their articles are quite complex and targeted at professional developers - but that's not to say it's content is irrelevant to the independent developer. Particularly when it comes to game design, Gamasutra's articles are often brilliant.

GameDev

www.gamedev.net

GameDev has been around for nearly a decade now and, over that time, has managed to earn a lot of respect and recognition. GameDev has articles, reviews and, of course, a forum, but their latest and most exciting addition is a wiki (wiki.gamedev.net). While quite small at the moment, we're certain the wiki will grow and prove to be a very handy resource. Keep an eye on it.

DevMaster

www.devmaster.net

DevMaster is similar to GameDev. It has a

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decent, although by no means extensive (at least not when compared to, say, Gamasutra or 3D Buzz) collection of articles and tutorials, which unfortunately aren't updated anywhere near as often as other sites we've recommended. News stories are added daily, though. The forum is very active and, like GameDev, DevMaster have brought in a wiki (www.devmaster.net/wiki/Main_Page). DevMaster also has a very good 'game and graphics engine database', which details the features, cost and quality of some 289 engines.

Independent Games Festival

www.iaf.com

Yes, it's a festival in California. Probably, if you're a student and all, jetting all the way to the US for this isn't something you'd realistically be able to do. But forget the festival. This mob annually run a competition for independent developers and, most relevantly, games development students.

Unity 3D awards

unity3d.com/contest

Another annual contest for independent developers. This year's finalists have already been announced, but there's always the 2009 contest.

Indie Gamer

forums.indiegamer.com

The forum is all there is to the indiegamer website. It's a good one, though, and noticeably more active than most of the other independent development forums out there - including some of the ones we've recommended. In addition to technical matters relating to game design and development, the Indie Gamer forum covers things like time management techniques, organisation, sales, marketing and legalities. Of course, you may have no intention of turning your little game into a commercial product, but if you do, Indie Gamer is the place to go for advice.

Game Producer

www.gameproducer.net

A very good blog covering many issues relating to games development, not just independent development. Game Producer some very good links and an archive of posts that cover a wide variety of very interesting and very relevant topics.

... you may have no intention of turning your little game into a commercial product ...

The prizes are nice, but the chance to have your work recognised is surely a major drawcard for the budding developer. Entries for the 2009 competition have closed, but there's plenty of time to work on a project for the 2010 competition.

ModDB

www.modbd.com/tutorials

A heap of tutorials relating to mod development. The tutorials cover basics, as well as more advanced topics. The parent site, the famous ModDB, is a good way of getting recognition for and distributing your mod. (6) CT





Harvey Norman JB HI-FD





Tabbed browsing? It's an open and shut case...

m a tab addict. I open them, and I can't close them: sometimes I have 30 or 40 open at a time. When you add up the tabs I have open at home and the work tabs it's more than 100 open at any given time. I know I'm not alone – I posted a poll on my livejournal and discovered that many of my friends regularly have more than 20 tabs open at any given time. Join my 'tab addicts' FaceBook group! What are you waiting for?

I blame Opera for my addiction. Back in version 4, among the dim mists of browsing history when frames were cool, "click here" was still acceptable and Google was barely a twinkle in Sergey Brin's eye, Opera had tabs when

I suppose I could use del.icio.us to save the pages of interest, but then I have to search for the things I wanted to remember (but can't) instead of just having them stare me in the face all day long. So it's tabs or nothing, for me.

The current winner of my tabbed-browser love is Firefox. FF3 has even, shock, replaced Opera. Sadly, though, that's the reason for this column: when you leave Firefox open with 20 tabs running, it both sucks RAM like a hog, and leaks it like a sieve. Okay, a slow, mostly plugged sieve, but still. My system runs like a slug in molasses. No, worse than that: like a tortured metaphor in an Atomic column. Seriously.

Once the list reaches 3072KB in size, it chokes. Increase the size in the Registry, though, and you solve some of the problems. I bet you can guess what I'm doing right now.

I bet you can also guess what I'm going to do next: open more tabs until I break my system again. See? I have the heart of an Atomican after all. Benchmarking is all well and good, but browser tabs is where it's at, baby!

There's a moral in here, somewhere, I think. Don't accept OS limits. Or at least push them until your system squeals a safeword. And if it balks repeatedly, get a bigger OS, or a bigger system. Or both.

But how can 55 tabs be wrong? If that's wrong, I don't want to be right.

no other browser did. You could argue that it was MDI (multiple display interface) rather than tabs: the point was that it allowed multiple web pages to be opened within a simple window in a switchable way. I learned to love the tab, and Opera handled things elegantly—when you closed your browser, it saved the open tab addresses to launch next session.

Lest you think I'm an Opera fangirl, I should point out that I'm browser-agnostic. I use, on various systems, Chrome, Opera, Firefox and Safari. In fact, the only thing I insist on in any browser is tabbed browsing. And, ideally, the ability to save my tabs between sessions. Oh, and a history that is at least 10,000 sites long. Or at least 6 months. Whichever is bigger.

That's because my method of working now relies on tabs. I keep tabs open until I've used the information contained within. Sites that trigger a nifty story idea are sometimes kept open for months. Several pages from www.zenhabits. com lurk at the bottom of my browser like Frankensteinian monsters, ready to revitalize my entire workflow at the click of a button.

Even worse, I can only open about 60 tabs before the system keels over. 60 is an unreasonably small limit.

Raymond Chen, in a column at MSDN says that "if you have to ask where operating system limits are, you're probably doing something wrong." But how can 55 tabs be wrong? If that's wrong, then I don't wanna be right.

I'd accepted that I would have to live with a stupidly imposed browser limit until, thanks to PC Authority's guest columnist Jon Honeyball, I discovered that a 64-bit OS will let me have more tabs open in Firefox without crashing my system! Over 100 tabs open in a single browser: can you imagine? I knew there was a reason for 64-bit, apart from that whole memory-addressing, 4GB RAM limit stuff, which, let's face it, nobody really cares about. 3GB of RAM should be enough for anyone! (Cough. Just kidding!)

I was all ready to shell out money when I chanced upon a blog post revealing at least some of the tab-related problem is about the desktop heap — essentially the list Windows keeps of all the UI elements on the desktop.

Zara Baxter isn't normally a size queen. Share your tales of pushing system limits at zbaxter@pcauthority.com.au





IF A FRIEND TELLS YOU LIFE SUCKS TELL THEM WHERE TO GO





GAMEPLAY

GAMES, GAMING AND FILM COVERED... ATOMIC-STYLE

We love this time of year. It's nothing but top-flight game after top-flight game, and the only bad thing about it is finding the time to play everything in your in-pile!

This month we've been thoroughly entertained and engrossed in the dark future world of Fallout 3. Yes, some content has been changed thanks to some short-sighted politicians; but it has not hurt the game one bit – as you'll find out after reading our review. But let's just say we've spent a LOT of time killing mutants this month.

The other thing we've been killing a lot of has been zombies. Fast

zombies, jumping ones, fat ones, you name it. If it says "huuuurrrrrr" we shoot it a lot around here. But that's just how Left 4 Dead rolls – unless you're playing as one of the dead, in which case the "huuuuurrrrrs" are on me.

James Matson takes time out from his busy MMO schedule and regales us with tales of a new Crysis mod that's got some very large plans (like, mech-sized plans), and Justin Robinson reports from Melbourne on the Call of Duty: World at War LAN that Alienware put on at Swinburne University recently.



O HARDCORE CONTENTS

Engine Room

Mechwarrior: Living Legends 84
Battlemechs make a welcome return in our report on an ongoing Crysis mod.

Call of Duty: World at War launch 88
Justin Robinson gets down with the
Japanese and a LOT of V.

Left 4 Dead 90
Fallout 3 92
Call of Duty: World at War 94
Midnight Club LA 95
WoW: Wrath of the Lich King 96

Fallout
Diary of the Dead





97



Mechwarrior: Living Legends

The incredible awesomeness of giant laser armed robots is back, and James Matson was there to cower.

echwarrior, or more accurately the entire Battletech Sci-Fi universe represents - for the most part - an infallible franchise. Like Warhammer, Warcraft or Dungeons & Dragons, Mechwarrior is a household name even in households that know little to nothing about the deep political workings of the Inner Sphere or the borderline psychotic joy of taking out a 75-ton Mad Cat Mech with a particle cannon from 100 metres away. The Battletech saga has spawned a multitude of tabletop games, books, an animated television series and even a collectible card game, all shining examples of the attention to detail and richness of the world launched by the FASA Corporation back in the mid eighties

Included among all these bits of Battletech merchandise were the wildly popular Mechwarrior video games, which most of us will have tackled at one time or another. Starting with the original Mechwarrior, the series became a multi-platform monster spawning three more instalments and a number of expansions with its successful mix of a rich Sci-Fi storyline and the simple pleasure of roaming around the countryside in a multiton, missile-armed behemoth.

Then, after Mechwarrior 4, everything went quiet. Actually, quiet isn't the right word; the landscape of Mech games just evaporated. The gaming community hasn't seen a Mechwarrior title in years now, and it seems like a travesty considering how perfectly suited to large-scale giant robot carnage the 3D. engines of today are.

When development of Mechwarrior 5 fell flat in 2003, it looked like no one was ever going to pick up the mantle and create the next big Mech game, but while the commercial



development world seemed to forget the magic that Mechwarrior created for a generation of gamers, the modding world didn't, and the talented bunch at Wandering Samurai Studios have begun a project that will bring your favourite Mech machines onto the PC screen amid a hail of rocket fire and plasma discharge. Daniel Tracy, Creative Director on the Mechwarrior: Living Legends project explains the drive to get something Battletech out to gamers.

"There hasn't been an updated Mechwarrior game for at least six years and there's a huge fan-base out there just waiting for a quality title to be released. Although the Battletech franchise is fairly old now, it still has a lot to offer."

He's not wrong there. An estimated twentyfive million people have played a Battletech or Mechwarrior RPG or read a Battletech-based novel, and at least ten million have played a Battletech-based video game. Daniel has been overjoyed at the response from the community.

"There is a huge international fan base, and support from the community of Mechwarrior players over the internet has been both positive and plentiful."

Living legends

So what exactly does Mechwarrior: Living Legends offer? According to Wandering Samurai Studios, the project seeks to create a massive, highly detailed outdoor environment where players can take control of over 47 vehicles (most of them Battlemechs) and slug it out against each other in armed combat with a twist.

"We are planning to release two game modes initially: Solaris Arena and Trial of Annihilation." explained Caleb Essex, the team's lead level designer. "The Solaris Arena mode basically allows two teams to fight to the death. Any equipment and vehicle restrictions are removed and there are no objectives other than kill the other team. Trial of Annihilation is a battle for the map itself. Your objective is to take away your opponent's bases, thus conquering the planet or area. We've introduced several new innovations to the mixed arms genre in both game modes to promote team work and give a new perspective on what can be done with gameplay of this type. We didn't want a game where the teams just capture and recapture bases endlessly. We wanted to make the players earn it, each and every time."

It's Mech combat in its purest form, but given a completely modern facelift; are you adjusting your pants yet? It's okay, you can admit it. The team has been careful to make respectful nods to Mechwarrior's tabletop roots with as much dependence on the same rule sets that the original game(s) contained, but some aspects have been tweaked or modernised.

"We followed the rules of what we always felt the strength of the Mechwarrior IP has been. Modular weapons, heat tracking on

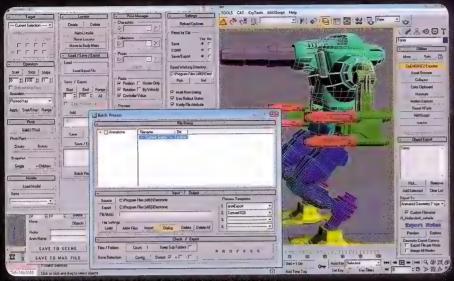


If you can name this Mech from sight only, you're a true Geek.

vehicles, battle armour that can jump and attach itself to the vehicles to ride into combat," comments Daniel. "Other things we've taken a few liberties with. We've slowed the Aerospace fighters down significantly, we've tweaked the behaviours somewhat to keep true to the spirit rather than necessarily the word of the technical readouts or documents pertaining to

the IP."

Fortunately for hardcore Mechwarrior fans, the team has worked hard to include not only all the iconic Mech units like the Mad Cat, Atlas and Raven, but also some of the best maps from earlier games. There's a definite feel here that old Mechwarrior staples are being mixed with some of the better advancements in game



CryENGINE2 provides the perfect toolset for bringing Mechs to life.

technology that previous Mech titles never had access too. The title will be faction-based – as is the expectation for any Mechwarrior game – and at the time of writing the two main groups involved in the fighting are The Inner Sphere and the Clan.

The player will be dumped into a major conflict between these two groups, with a campaign scenario of three maps laid out to re-enact historical engagements between these two old foes. The separation of the two fighting forces trickles right down to the design of the Mech's themselves, with different technologies and appearances for both. For example, in the Battletech universe the Inner Sphere - due to the fall of the Star League - has degraded to nearly 21st century levels of technology. The quality of the Mech units is reflected in this, being in a state of disrepair before they even enter combat, indicative of the lack of equipment available to maintain the machines of war and a lack of skilled labour across the Inner Sphere.

Crying mechs

What's likely to generate the bulk of the interest around Mechwarrior: Living Legends however, is the engine of choice – the monster of FPS technology, CryENGINE 2. That's right, not only will we have an updated Mech universe to trample, but we'll be able to do it inside an engine that represents the cream of the crop when it comes to cutting edge tech. CryENGINE 2 has a number of features that appealed to the team beyond simply its pretty visuals.

Powerful instrumentation allows them to analyse engine performance in real time, create detailed memory usage reports and run automated walkthroughs of each level to get consistent results from build to build. The modular C++ design of CE2 gives the team access to logically separated DLLs that they can use or modify as needed without affecting

the overall engine framework. While there were plenty of other options, none were as technically capable of presenting the level or art or scale that CE2 could. Even with the incredible power of CE2 behind them, the team has had to make adjustments to suit the specifics of Mechwarrior: Living Legends,

"It would not be possible to use CE2 'as is'

want a challenge a reasonable shot at infantry style combat. While the armor is effective, it also takes a skilled player to be able to fight in it.

Other things we've added include replacing most of the vehicle movements, and heat management as a game dynamic. Of course there are custom effects and sounds. We've heavily modified the serialisation and network system to allow us to run larger maps, 8km on a side in fact, and quite a few other things have been added or removed. We are not making another episode of Crysis, after all, but rather trying to create a whole new game, with new rules and behaviours."

The biggest Mech of all... The fact that Mechwarrior is a commercial

The fact that Mechwarrior is a commercial and very much bought-and-paid-for IP (by Microsoft no less) meant that Wandering Samurai Studios had to do the right thing and contact the software giant to establish legitimate access to the resources of the IP.

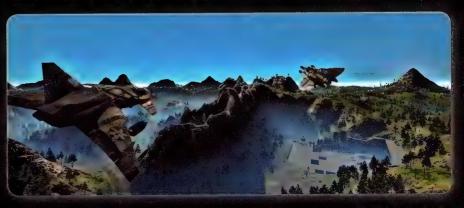
Microsoft was contacted very early on in the project as it was imperative to the team's success that they not face any legal hiccups during development. Particularly as legal hiccups with Microsoft usually result in the perpetrator disappearing without a trace amid a flurry of men in black suits. Through correspondence and phone conversations with the licensing and legal department at

... not only will we have an updated Mech universe to trample, but we'll be able to do it inside an engine that's the cream of the crop.

and have the game work as designed. First off, the nanosuit is gone. While you're faster and stronger than Nomad or Psycho, you're wearing powered armor. It does still heal you over time, it does provide some protection, you also have jump jets to help you leap tall Mechs in a single bound and a claw to latch onto them. Having said this, I should note that this game is really about the vehicles. Getting them true to Battletech in feel resulted in them outclassing regular infantry and because of this we made the hard decision of removing it. The battle armor is our way of giving players that

Microsoft Corporation legal and corporate affairs offices, the team received "non-exclusive, non-transferable license to use and display Game Content and to create derivative works based upon Game Content included in the 'MechWarrior' Intellectual Property, strictly for non-commercial use".

MechWarrior: Living Legends is being created under Microsoft's 'Game Content, Usage Rules' using assets from the MechWarrior Intellectual Property, so the entire project has an official seal of approval from Microsoft and access to just about anything.



required from the IP. This is great news for fans because there won't be any need to step around easily recognisable or 'trademark' aspects of the Battletech universe, freeing the mod team to create something that can tap the almost limitless IP for all it's worth.

While all the work done thus far points to an amazing end result, getting the Mechwarrior universe back onto the screens of PC owners hasn't been an easy road, with Sean Tracy the teams Technical Director/Producer drawing parallels between the struggles of Wandering Samurai Studios and full commercial outfits.

"A commercial studio has specific tasks that are expected to be accomplished. They need their assets such as sound effects, particles, models, animations, textures etc. While it may be reasonable to have an animator provide input to the programming team on game physics, they generally don't do much texturing or modelling. To that end, studios have a budget they spend to hire modellers, and animators, programmers, and sound technicians. These highly skilled individuals are difficult to find and even more difficult to have work for free. The team we work with is amazingly skilled, but it's all on a volunteer basis. The work they do has to fit into their lives, between spending time at work, school, with family and friends. We also have the challenges



of difference in geographical location; our team is truly global. To synchronise a team of that size requires resources and specialised software, in addition to many late nights. It's difficult for mod teams in the current climate to gain credibility as so many teams fail and get left to the wayside. We find ourselves spending a lot of valuable development time on media that proves our worth and credibility as developers. This is unfortunately a requirement now for any mod team, whereas a commercial studio is only faced with proving something to their publisher."

Regardless of the hurdles, everything we've

seen and heard points toward a game mod that's being crafted with love, attention and enough firepower to level a densely populated central business district and still have energy left to scramble a mean clutch of eggs.

We've been told the release date is late winter 2008, which for Australian folk puts it somewhere around December 08 to January 09. If you've got a copy of Crysis and any kind of appreciation for Mech-based combat, do yourself a favour and keep tabs on the progress of Mechwarrior: Living Legends between now and the end of the year. See you on the battlefield.

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Alienware Call of Duty: World At War LAN

24 hours of energy-drink fuelled mayhem!

othing draws a larger crowd than a professionally organised, intricately arranged LAN – even more so when you're hosting it at Swinburne uni, in Melbourne, with over 100 computers and consoles with the latest game! With the goals of this LAN set appreciably high, Atomic was flown to Melbourne (thanks to Alienware for the tickets!) to take part in this exciting event.

This was to celebrate the launch of *CoD:WaW* in Australia, and the attraction for gamers to try it out with other like-minded souls was obviously overpowering, ensuring heavy attendance.

Ringed around this central collection of computers were a total of 105 Xbox 360s, again running CoD:WaW. Comfy little blowup couches gave gamers a great place to rest their derrières



So what was there?

We arrived at the campus at 6pm on the Saturday, when the LAN had been going for two hours already. Fresh-faced hopefuls continued to stream towards the event, backpacks bulging with favourite mice, snacks, drink, and anything else that a gamer could need. Walking up the steps into the always-impressive Swinburne uni, intimidating Alienware posters were everywhere, beckoning us in, hinting at what we'd soon find inside.

Walking through the doors, we were hit by a sudden cavalcade of noise – over five hundred gamers were already here, and gaming hard! The main chamber consisted of 100 Alienware computers, arranged into four banks of 25 computers, each with their own network. Razer gear including mice and keyboards rounded out the experience, as well as large LCD monitors and headsets to immerse them in the game.









as they played through either the singleplayer campaign, or deathmatch, in coop modes or by themselves. An equal number of 22in TVs were also there, and each 360 was cable tied around the drive slot – discs can walk very easily if not watched constantly.

Adjacent to this main chamber was a smaller room, with three more consoles set up with Guitar Hero III and two guitars each. These had a large crowd for the entire event, and were very popular; there just weren't enough of them!

Keeping all the gamers enthused and entertained while not LANing was a DJ with decidedly large speakers and lights, playing classic trance music. Not only that, but thanks to the guys at Frucor Beverages a truck showed up with no less than **five thousand cans of V!** This huge amount of energy drink came in five different flavours (though we've never seen such a desperate rush for the original flavour before – they were all gone in



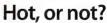
minutes, leaving the other flavours for the rest of the LAN). And finally, suggestive booth babes were also there in full army fatigues. Well, they'd be full army fatigues for some kind of pr0n flick, and the Alienware logos did make them seem more suited to Area 51 than a LAN, but they were still very nice to all the gamers. The babes came in handy for convincing some gamers to give up the computers and let the other gamers have a go!



A few hiccups

No event ever runs as smoothly as planned, and this one certainly wasn't immune from this rule. Originally a lazer zone arena was going to be erected outside, giving gamers a chance to run around and get some real-life-esque battle simulation. Sadly, strong winds and rain the day before prevented this from happening, but it was definitely a nice idea.

Then when the DJ started up his music, with lasers and lights on the same circuit as 25 of the computers, there was a power outage. Seems that the current from all that gear wasn't considered, forcing a DJ relocation at 8pm or so. In true gamer style, a cheer went up from the crowd as their games were interrupted suddenly. To top it off, someone pulled the fire alarm, sending everyone outside at 9pm momentarily (though we did get to see a firetruck pull up). Otherwise the event ran smooth as rich, creamery butter.



This event was definitely a lot of fun, and kept us gaming for a huge amount of time – we didn't even get out of there until 4pm on Sunday! With a little tweaking, this event could be even bigger in future years, and getting a regular gaming event like this will only gain recognition for Aussie gamers. We're certainly looking forwards to the next one (hint hint)!

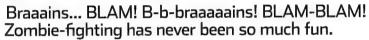


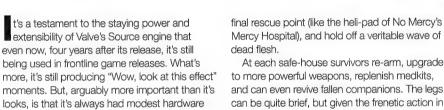






Left 4 Dead





like Far Cry 2, Crysis and Call of Duty 4, that hardware can positively tear through pixels and polygons in Source. In Left 4 Dead, the by turns zombie killing or zombie empowering shooter, that speedy response is put the test with hordes of zombies.

gallons of blood splatter.

requirements. Given that a lot of gamers have, in

recent years, upgraded in order to play big titles

We always like it when a game comes with a co-op mode, but L4D is practically built around the co-op experience, either online or over LAN. There's is a single player campaign mode, and it's solid, too, but it's not until you go online with a full complement of eight players that the game really comes alive.

The story of the game is simple - it's two weeks after the initial zombie outbreak, and undead hordes have started to... change. New varieties are emerging, faster, tougher, and downright more diabolical. It's in this setting that four survivors - the lucky few who are immune to infection - must make their way from safe-house to safe-house, extraction point to extraction point, in order to survive.

Each campaign - and there are four of them, in both singleplayer and online modes - features four or five legs. You start in a safe location, and must make it to the next safehouse in each leg but for the last one, where you make it to your

Mercy Hospital), and hold off a veritable wave of

At each safe-house survivors re-arm, upgrade to more powerful weapons, replenish medkits, and can even revive fallen companions. The legs can be quite brief, but given the frenetic action in each one, you'll be glad for the breather. What's more, in online versus play this is the point you get to swap sides - in effect, the challenge in this mode, where you and your team get to play each leg as both survivor and undead, is to see who can finish fastest (or just survive the longest).

It might seem like no fun, the idea of playing as a simple zombie (even though these are 'fast zombies' - see boxout), but in multiplayer

you get to play as one of four special zombie types. The Hunter is your classic pounce predator, climbing about each level and pinning survivors with fast slashing attacks. Boomers are tubby bastards with the ability to vomit up a zombie-attracting bile onto survivors, as well as featuring the unique ability to detonate when shot. Smokers (don't laugh), feature a distracting, fumv haze, and a ranged tongue attack that can not only pin and constrict survivers, but also drag them close for some personal, slashing attention. There's a fourth class, the Tank, that only spawns once or twice in a campaign - think the Hulk with a yearning for fresh flesh.

When these classes are combined with the hordes of game-controlled zombies, triggered either by the game's Al-like Director or the Boomer's loving bile, the mayhem can get truly insane. More importantly, this is when the game's excellent level design and balance comes into play.

With only four survivors, the ability to carry limited meds and weapons, even just walking down a corridor becomes a tactical challenge. Do you rush down it, hoping that the nastier





zombie types (ie, the players) are respawning or not in position, or do you carefully advance cover to cover, with a point man and one at the rear? Do you load up on molotovs or pipe-bombs? Even finding the perfect balance between close in firepower and long ranged precision becomes a fraught decision.

Similarly, the tactics when you play as infected are just as deep. As a Hunter, do you pounce early, to confuse the survivors while other dead things get in position, or do you let the Boomer open up with its vomit attack, and then wade in amongst the oncoming horde to do your dirty work. As the Smoker, your challenge is that grabbing and drawing survivors to you is easy, but once you have someone helpless you cannot move. Given your tongue (or whatever it is *shudder*) is like a big pink flesh arrow pointing right at you, you'll want to choose your position and moment of attack perfectly.

Of course, there's the hordes of normal infected to fight through as well, and as scary as two or three Hunters or a single marauding Tank can be, it's brainless masses that give the game its real flavour. Whether they're just standing

around a room, heads vacantly lolling on broken necks, or rushing headlong in pursuit after you, they provide the chilling background noise for the game's high-pitched action.

And, as we said, it's fast. Our new NRG test rig - with a single 4870X2 - easily handled the moody darkness and grim urban and worn woodland surrounds of each level, but it's the sheer numbers of enemy you can face - we've not counted, but when Valve says horde it means it - that make you thankful of modern hardware. Too, when that horde is getting blown to chum, and the walls are running with blood, and your pal is covered in green Boomer bile, the action doesn't even stutter. Finally, L4D has some of the best facial animation we've seen in any game - it comes closest to overcoming the uncanny valley than any game before it. Handy, in a game where a character's fear is an important story and game element.

About our only worry is that with only four campaigns, there's not a lot of variation. Downloadable content has been promised, and online play goes a long way to offset the lack of map variation. Similarly, the weapons seem a



More Snyder than Romero

There are no truly shambling hordes in Left 4 Dead. They start slow, but once they get a bead on you they run full pelt. Amongst zombie-philes, there's an ongoing debate as to what the truest form of the zombie is - Snyder's fast zombie? Romero's shambling brain chomper? Where does 28 Day's Later's chilling infected come into the picture, then? Are they even zombies at all? The other interesting thing about L4D's dead is that headshots are not the only way to kill them - a single well-placed round can drop them.

little limited for a modern shooter - there's only one assault rifle, one SMG, two shotties and pistols, plus grenade-like weapons. Some more variation, or the ability to upgrade weapons, a'la Call of Duty 4, would help in that regard as well. There are also some clipping issues in particularly busy sequences, and the lift in Mercy Hospital can be very buggy.

But none of the bugs stop this from being a great, highly addictive game, another feather in the cap of Valve's Innovation Hat. Long live the zombie! (6) DH









Fallout 3

It's just you - and maybe a dog - against the world of the future.



t would be easy to simply come out swinging as a bunch of Fallout fanbois. The series has long been a benchmark of quality gameplay and quirky humour in a market that can often take itself far too seriously. Which is why, when we say that this game is easily one of the best of the year - if not last five - that we feel compelled to point out that the main reviewer was not even a Fallout fan before Fallout 3 found its way onto their hard drive.

The game takes the staples of the action RPG genre and does some truly unique things with them. Character creation is a truly organic process that not only gives you all your lovely stats and numbers, but one that immediately drags you into the gameworld, setting up a number of important plot points as it also introduces you to the game's mechanics. As a newborn, staring up into your father's face, you choose what you look like; as a toddler, you learn to walk and use things, and choose your SPECIAL (Strength, Perception etc) stats; then you turn 10 and at your party you learn the intricacies of the social system that underpins the game. Finally, at 16, you undergo an aptitude test to find you a job in your underground home, and get skill stats assigned appropriately.

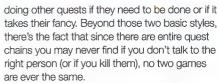
You wanna get outta here?

As the game starts properly, you are forced to flee your Vault home and head out onto the surface, and you get one last chance to review and change your skills and other details. You might be tempted to tweak, but like Oblivion, the game's really good at picking your favourite play style.

The way the story progresses, too, is rooted

in standard gaming fare, but Fallout's devs have done amazing things in the way quests and your actions move the plot along. You leave the vault to track down your father, who, it appears, has not only run off into the radioactive and violent blue yonder of the outside world, but also seems to be far more than just the humble doctor you thought him to be.

On the way you find the usual array of sidequests, but only if you really look for them. It's here that fallout 3 really starts to excel, to become a different experience for each and every player. We've talked to a lot of people playing the game, and each experience is different. Some are going the friendly route, talking to everyone, completing all the quests they can find, and becoming local heroes. Others - as we have - are simply following every clue about their dad that they find, and only



More importantly, neither play style is punished. If you take the time to do all the quests at the first major hub, the town of Megaton, you will be cheered and applauded whenever you spend time there. If you keep moving on, however, you might be worried that your lack of experience will hinder you down the track; it doesn't, thankfully, and even though we've taken the 'find dad at all costs' route, we don't feel like we're missing out on anything, or that we're drastically under-skilled.











Nor does Fallout 3 seem to fall into the same error that Oblivion did, by auto-adjusting NPC power to match your level. Trust us, when you accidentally monster train three super mutants, you'll know these big bastards are not pulling any punches!

There are entire systems to the game that we've not had a chance yet to fully explore, like the crafting of blueprints and the pet dog you have a chance to find. There's scads of quests, often with sub quests that improve your rewards and XP. Plus the game-stat tracking is excellent - every time you load a game a new set of stats is reported: number of silent kills, amount of times you've been addicted, books you've read... it's a number cruncher's dream.

And speaking of addition, while the Fallout 3 humour is there (especially in the kitschy retrofuture that existed before the bomb dropped), it's a pretty grim game otherwise. Dead NPCs stay dead, even buddy NPCs like Dogmeat, the pet you can find. Drugs can boost performance, but only at a price, and addiction can be a problem. The wasteland is also populated by many raiders that simply don't want to play nice - finding the burnt remains of their tortured victims is an often

sobering experience, and many of the games quests involve some harrowing moral decisions. We do have to add, too, that even though some content has been changed for the Australian version (thanks for that, Michael Atkinson), it really doesn't impact the game itself.

All the colours...

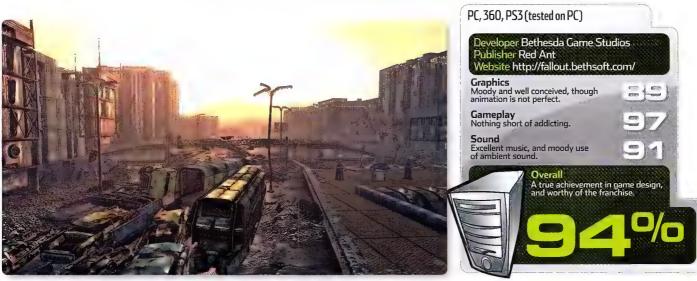
It's ironic that the colour palette the game uses most - browns and greys - is mostly associated with old-school games limited to poor colours by the technology of the time. In Fallout, however, those tones help provide a sense of place in the desolate and dangerous Washington DC wasteland. This is not the happy, pastoral fantasy land of Oblivion, but rather the aftermath of near-unlimited nuclear exchange. It's not meant to be bright and happy.

The Gamebryo engine does an outstanding job of presenting this bleak world; on our NRG test machine's 4870 X2 we were able to practically max the settings without any hit to frame-rate. View distance is particularly impressive, and trust me when we say that your first look at the outside world (once your eyes

adjust) is breathtaking. About our only complaint is that a lot of character animations are very stilled, especially when viewed at a long distance.

Fallout 3 is one of those rare games that those who play it cannot stop comparing stories, that you think about long after your last play session, and one that you cannot wait to get back to if you've not loaded it recently enough (like, say, two hours). And we've barely scratched the surface of features like the VATS targeting system, the mostly excellent voice acting, or the Karma system. But trust us, for RPG or action fans, this is a once in a decade game that can just about be all things to all people. Play it through as soon as you can, so you can start playing it all over again. (P) **DH**







Call of Duty: World at War

You know that thing about about so called odd-numbered Call of Duty games? Yeah.

So let's play fit-as-many-cliches-as-you-can. Our target is Call of Duty Fi... I mean, Call of Duty: World at War, Your time starts... now!

Ah, yes, there's the spinning retro news-cast globe. The danger-red lettering of JAPANESE OCCUPIED TERRITORY – very newsreel – and then we've got the stirring music. Cue the archival footage... there it is! Oh, wait a minute, some of this looks a bit too modern, but at least it's different... looks like I might be a missing soldier captured by the Japanese; guess that's kinda clichéd. This voiceover sounds familiar... oh, Jack 'Keifer Sutherland' Bauer! Big score there.

Now some gameplay at last. Or at least the chance to move my head while the developers convince me how evil the Japanese are. Torture? Check. Sneering superiorty? Check. And would you look at that? Marines! Rescuing little 'ole me! Well hopefully, my the ballistics are going to be good – this M1 Garand looks the job, but... wow, it sounds like a pop gun. And, wait a minute... what do you mean I need to reload? You can't reload a Garand if there are rounds left in the clip... oh. You can in WaW.

Epic fail right there.

When Call of Duty 4 came out and ditched the by then slightly worn and dog-eared World War II setting, people were sceptical. However, as it turned out it was a great decision, and game was a groundbreaking exampled of narrative structure and tight multiplayer mechanics. It's still

one of our favourite online shooters.

So when Treyarch got tapped to take the series back to the grim war years, the sceptics again had a field day. We've long been fans of the WWII shooter, but even we admit that – just perhaps – it's seen it's time. Unless, that is, Treyarch were going to bring something substantially new to the table. World at War is, after all, built on the same engine as CoD4.

Instead, the game is surprisingly lacklustre, and seems a definite step back in comparison to the game before it.

As we said, it's built on CoD4's engine, and that pedigree certainly shows in the graphics. Lush jungles and open ocean await you in the Pacific campaign, while the full desolation of the Eastern Front provides ample atmosphere for the European campaign. But looks are only half the deal, and the gameplay that sees you traverse the pretty locales is simply a dose of the same old stuff we've been seeing in WWII games now for years.

While some levels boast multiple paths to target, the so-called open-ended-ness we've been promised really doesn't seem that different to what we've seen in previous titles. You're also constantly being yelled at by officers and sergeants; this does leave off a little in later levels, and we guess we should be thankful there are some good actors behind the voices (though, really, did Gary Oldman lose a bet or something?).





But it's the little things that niggle the most. The interstitial elements between each level are an odd mix of period footage and modern graphics that don't really gel. Then there are issues with the weapons, like the modelling of the aforementioned M1 Garand. It was a great rifle, but one of its drawbacks was that you could not reload half way through a clip – a fact this game ignores. Call us picky war nerds, but it's something that every other game gets right, so we don't know what went wrong here. Plus the sound of firing seems flat and lifeless. Combine all that with a very unimaginative Al and the single player is decidedly average.

Multiplayer looks up a little at least, and co-op is a welcome addition to any game. The multiplayer is let off by being built on one of the best online games in recent years, so Treyarch would have really had to try hard to mess that up.

This is a game that we can really only recommend to hardcore fans of the franchise. Then again, they are hardly the type to bother with reviews in the first place. For anyone else looking for a good gaming experience, at this time of year there are many better games to choose from.









Midnight Club LA

Satisfying your urge to tear it up in style through the City of Angels.

t heart, we here at Atomic are shooter fans. More than any other game, that's the kind of virtual action we reliably seek out for gaming session after gaming session. But – and it may surprise some to hear this – we really don't mind sitting down with a racing game just to switch things up every now and then. And Midnight Club LA has proven itself to be a quite a diversion from the way of the gun (or bow – we're also quite partial to Lord of the Rings Online. Don't laugh).

But it's a diversion that can cause as much consternation as it does it does racing joy.

Regardless, Midnight Club sure is pretty! It uses the same RAGE engine as used in Grand Theft Auto IV, but without the need to show the city close up and at walking pace, there's a lot more visual polish. Lights really shine, and after a rain storm LA looks particularly beautiful. Using GTA's engine also means the traffic levels can dynamically fluctuate in time with the organic day night cycle. Combined with the attention to LA detail, this is a game that you'll wish you could actually walk around to take in, rather than speed through dodging traffic.

And speaking of LA, we've got to commend



the designers for bringing the place to virtual life, especially given the vastly reduced scale of the playable area. We've been lucky (though I do use the term advisedly) enough to drive around the real LA, and what we saw in game really does match all the highlights of the real place. With all the polish and game magic on top of that, it's like being inside a film like Heat, or any other LA crime masterpiece.

And don't get us started on the cars. We're not rev heads by a long shot, but we've become quite addicted to tricking out our vehicles – and the options to do so are nearly limitless. With each car also topping in at over 100,000 polygons, they look the business as well.

Unfortunately, it's when you start looking beyond the gloss reflections and Attention Deficit Disorder collection and tweaking systems that the actual gameplay starts to falter.

The plot is, well, largely irrelevant. You're a young racer looking to cement your place in the street racing firmament – much more than that you really don't need to know. Essentially, the key to it all is winning races; as you cruise the streets you'll be called by friends and rivals alike to alert you of potential challenges. If there's one thing the game does well, we admit, it's that you can quite easily play the game with nearly no intrusion from any kind of UI. Everything you need to know pretty much gets presented to you in a real world manner. You can also find random racing opponents for one on one challenges, simply by flashing them at the lights.

And then, you're racing – one on one, or eight cars going flat out, or maybe even one of the super tough freeway challenges. And we mean super tough, because all the racing is going to push your skills – and possibly patience – to

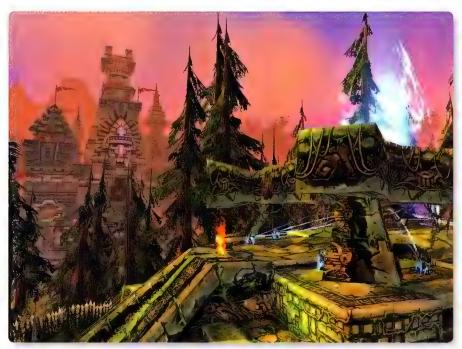


the limit. The racing AI has an uncanny ability to dodge traffic and accelerates faster. With such 'skilled' opponents, any mistakes of yours, even the smallest collision, can make a race unwinnable from the outset. On the flipside, you at least do feel very accomplished when you do win.

As a pure racer we have to admit there are better titles out there, but there's still something about Midnight Club LA that appeals. As frustrated as we get, we keep firing it up for another round of punishment and pretty lights.

Must be the pretty lights, then. (6) DH





World of Warcraft: Wrath of the Lich King

We've barely scratched the surface of the final product, but so far so good!

he charge of millions of gamers rushing to Northrend has left Shattrath and other capitals bereft of hawkers, and the NPCs are wondering who will buy their wares. Wrath of the Lich King hit the shelves in November and we've been on the front lines. It's been two years since the release of the first expansion and the game just recently celebrated its fourth anniversary. So, what's in the box, as they say, and is the new expansion worth all the bother?

First up, this expansion release and patch day went much more smoothly than the previous version and that in itself was a relief - we also didn't need to download and apply new patches for content or have hotfixes applied every day, which is a vast improvement on the issues that faced gamers at the launch of Burning Crusade. Blizzard seems to have its stuff together on this one and the beta testing phase must have been extremely worthwhile, if only from a technical standpoint. Technical changes such as the new shadow system combined with the new zones have also made this a very pretty expansion. Early zones such as the Howling Fjord, Borean Tundra and Grizzly Hills are a real pleasure to quest through as far as the look and sounds of the zones are concerned.

Now onto the game itself! Obviously, the first Hero Class has made its appearance and

stomped through the balance of the earlier levels (ie the late 50s and the 60s) but how does it rank up in the 70s and at the new level cap, 80? The introduction of the character class was a brilliant piece of storytelling and design implementation: a thoughtful quest-line that places players in a phased area of the Plaguelands to learn their DK craft before releasing them on their factions at level 58 or so. It's a very clever way of allowing players to pick a character that effectively starts them off at level 55 with an impressive set of Good Quality items that are replaced by Rare items during this training phase. So how do they play?

Blizzard has stated that it intended the Death Knight as a new tanking class to make tanking options for players more broad – certainly many people leveling Death Knights are using them as tanks quite successfully. As an added bonus each of the talent trees seems capable of soloing content, which should help people leveling through the Outlands content as they catch up to friends in Northrend. Plus we now get the interesting addition of Unholy-specced Death Knights tanking with a ghoul pet – this in itself makes those five-person dungeons a little different. Hell, with the right combination of players and pets you could get a ten strong party going!





Other things to love include the acquisition of new gear – the designers made it possible for characters who are better equipped with raid gear to hold onto those purples for a while longer, while players working up from the high 60s into the early 70s will definitely get quality upgrades. This is a big change for the better as the early levels in Outland saw gear that outstripped Tier 3 raid gear and left many players feeling that their hard work was all for naught as they sold or sharded their hard won epics in favour of Outland green quest rewards (although, as expected there are teams raiding the end-game content already).

However, there are always quibbles when you make such sweeping changes to a well loved game and Wrath of the Lich King is no exception. And here's ours – poo quests. Really, how many quests must we have that involve collecting it, making wolves create it or producing it ourselves?

Enough is enough! (6) LS



Diary of the Dead

David Hollingworth is fighting zombies and Left 4 Dead.



Shit.
Two weeks after first infection, and we're still in the city.

Out there, the infected are getting stronger. In here, we're all getting weaker. We're going to have to make a run for the hospital, to its helipad. Maybe we'll get rescued, maybe we'll get turned into dogfood.

Well, at least we won't become infected ourselves. Everyone I know may be dead or worse, but at least being immune has some upside. Anyway, looks like we're about to make the run for the first safehouse. I'll try to write down more when we get there.

Fuck me, that was tough. Taking point on a four-man – I mean, person, sorry Zoey – team, mostly civvie, is a tough job. Taking point with limited ammo, a poor choice in weapons and hordes of infected is seriously harsh. We nearly lost Louis, but we pushed that fast thing, a Hunter I think Francis called it, off of him quick



smart, and a load of buckshot took care of him real quick. Must have gotten too noisy, though, cause the horde hit us real fast soon after.

Francis ran out of ammo, I was down

to butt-stroking the damned dead things, and it was only Zoey and her pistols that kept us up. Damn humbling, that. And me a vet and all.

So we pushed out into the street after

FALLOUT

that. Open fights, much better – you could see the enemy coming, and they weren't much interested in dodging or hugging cover. Musta killed twenty or thirty right there. Safe house weren't far after that, so we humped it over and rearmed. Don't know who set these up, but bless 'em.

Anyway, gotta pound the pavement again, so sayonara for now.

They're mutating. Sweet Jesus, they're evolving! Hunters first, now... things, exploding, corpulent corpses full of... God, I don't want to think about it. Whatever it is, infected – hell, ZOMBIES – love it. Zoey caught a stream of it and in the blink of an eye a howling mass of dead was all over here. We couldn't club 'em off! Had to blast 'em with buck and 9mm rounds. I think we clipped the poor girl, maybe Francis with his shotgun, but she didn't complain.

Just got back up and ran with the rest of us.

'Course, she was covered in shit by then. I hate sewer fighting. Still, we made it into the hospital, so that's a small mercy. As always, the safe house is stocked up, and I've even picked me up an M16. Thing's a piece of shit – an M4 would be much better for this kind of fightin' – bit man, it feels good to have a proper longarm.

We're moving out again. Write more if we're still alive at the end of this.

Time was, I hated the sound of choppers. Too many bad memories... but now... music. God-damned music to my ears.

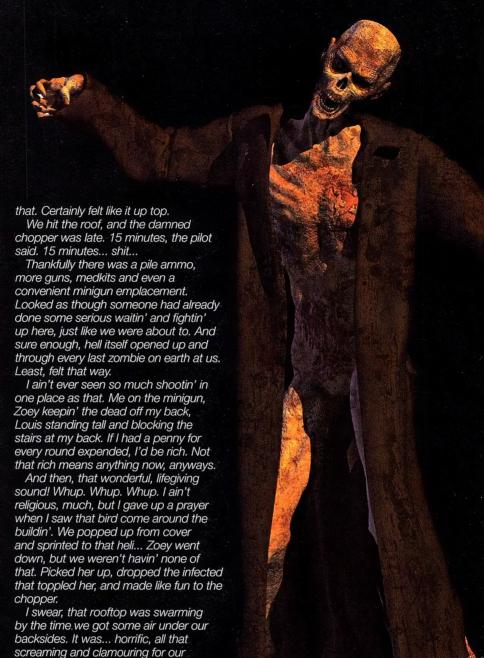
The fight up through the hospital was bad. The worst yet. Hunters, Boomers, things that... shit, some things I just don't even want to try and remember. That little girl, the crying girl... what she did to Francis... shit.

But we got to the elevator. Left a pile of dead up to my shoulders in the corridor outside, had to cave in a Hunter's skull when it leapt into the elevator car after us, but we got there. Then it was the long slow ride up, Lord knows what skulking about on the car's roof.

We high-tailed it out before we got a chance to find out.

The upper floor was under construction, open to the sky. Louis got pushed off by the biggest lump of dead muscle I've ever seen, some kind of flesh Tank, and I had to get Zoey to cover my ass while I hauled him back up. No way we was leaving him to fall or get torn to pieces. Not after that Witch and what it did.

So yeah, fightin', blowing infected to hell, getting covered in their dead blood. Must have looked like the Apocalypse come if there were anyone down at street level, all those bodies rainin' down like





And what next? Well, who

knows, and for now I don't

care. (6) DH

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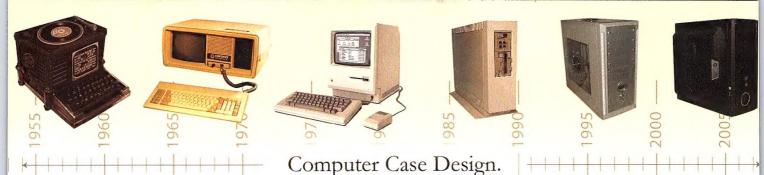


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Okay, so we skipped a few generations.

The Skeleton Case from Antec, here ahead of time.



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